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THE
DENTAL COSMOS:
A
MONTHLY RECORD OF DENTAL SCIENCE.

Devoted to the Interests of the Profession.

EDITED BY
EDWARD C. KIRK, D.D.S., Sc.D.

Observe — Compare — Reflect — Record.

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THE DENTAL COSMOS.

VOL. LI.

JANUARY 1909.

No. 1.

ORIGINAL COMMUNICATIONS.

SOME NEW RESEARCHES INTO AMALGAMS.

By A. FENCHEL, Sc.D., L.D.S., Hamburg.

II. THE SPECIFIC VOLUME OF THE TIN-SILVER ALLOYS, AND ITS APPLICATION IN THE APPROXIMATE ANALYSIS.

THE study of my last publication on amalgams (Cosmos, 1908, vol. 1, page 553) has evidently made it clear even to the uninitiated that our knowledge of the internal processes in the formation of amalgam is still very limited. Many inquiries have proved to me that intense interest is being taken in this widely used tooth-filling material, and this fact has prompted me to publish a series of investigations which appear to be of general interest, selected from the almost overwhelming mass of material gathered during the twelve years of my researches in this field.

To begin at the foundation, I shall take up the action of the specific volume of the basic ingredients, silver and tin, in alloys.

In dental circles the alteration of form of amalgams has been considered as peculiar to them. Black⁽²⁾ first drew attention to the fact that tin and silver in alloying change their form.

My results, however, do not agree with those of Black, which I shall therefore discuss in detail.

Black in alloying tin and silver found contraction to take place, and calculated this contraction to be, in alloys of silver 40 and tin 60, $2\frac{3}{4}$ per cent., in silver 73 and tin 27, 4.02 per cent. If we closely investigate these figures of Black, however, we find that a mistake must have crept in, which upsets his conclusions.

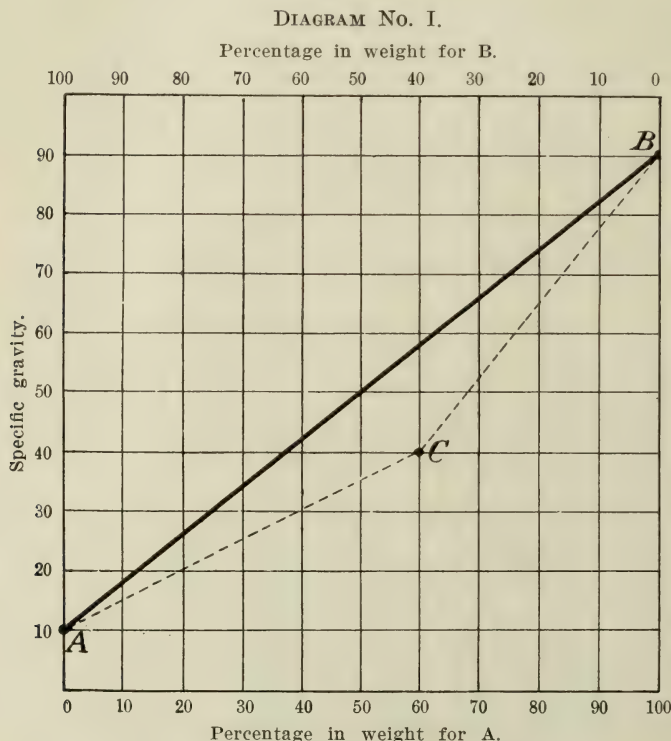
The alloy 40:60, by the loss of tin in melting, was reduced to silver 40.2, tin 59.8. From this Black figures out the average specific gravity of 8.318. The specific gravity of silver and tin is by both Pinner⁽³⁾ and Kraft⁽⁴⁾ given as 10.5 and 7.29. To enable every reader to ascertain the correctness of these figures, the calculation for 1 ccm. is reproduced, as follows:

$$\frac{40.2 \times 10.5}{100} = 4.22 \quad \frac{59.8 \times 7.29}{100} = 4.359$$

The addition of these two figures gives as the average specific gravity 8.58, and not 8.318 as Black calculates. The weight which Black really ascertained is 8.509. While Black, then, states an increase of the specific gravity by 191 mg., or a decrease of the volume by 2.34 per cent., his own figures prove, after a correction of his mistakes in calculation, a decrease of the specific gravity by 72 mg.,

assuming a contraction in volume of 4.02 per cent., which is also to be reduced to 1.75 per cent. This revision of Black's own figures consequently shows that by no means do all tin-silver alloys contract in melting, as Black concludes.

The specific volume or weight must be regarded as a linear function of the proportion of ingredients and of the specific volume or weight of the two components,



or an expansion of 0.8 per cent. of the volume.

As a second example, Black cites the alloy silver 73, tin 27, which owing to loss of melting results in silver 73.33, tin 26.66. For this alloy Black figures out an average specific gravity of 9.416.

This calculation is also wrong. According to the above formula it should be 7.699 and 1.943. Both added give as average specific gravity of this alloy 9.64. The actual specific gravity of his alloy Black figures to be 9.814, consequently

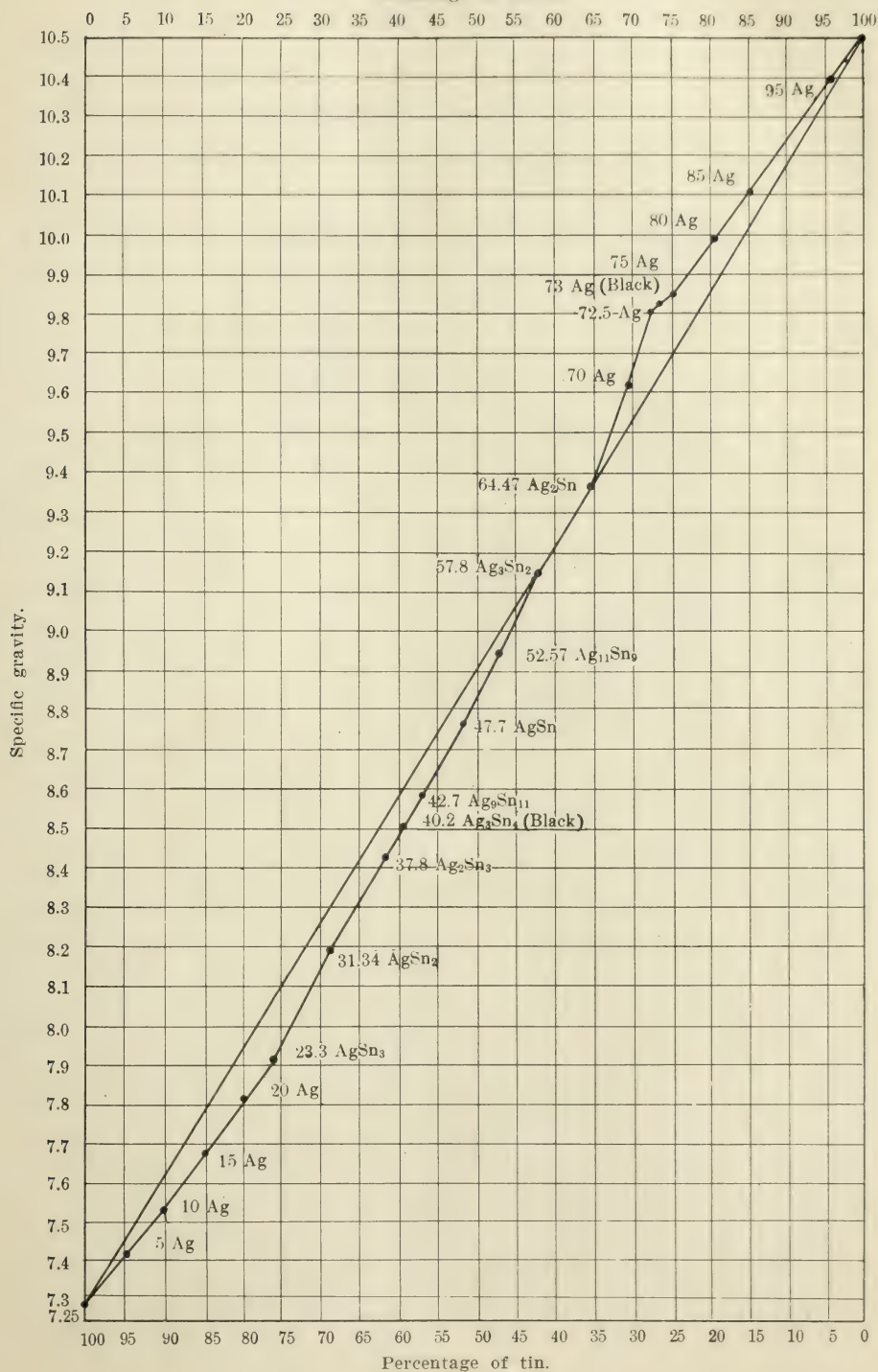
if the two metals do not enter into chemical combination and if no crystals of combination are formed. (Cf. diagram No. I, A-B.)

If, however, combination or mixture crystals are formed, they are shown by deviations from the straight line. (Cf. diagram No. I, A-C-B.)

In this diagram the abscissæ indicate the percentage in weight, 0 to 100, of the components; the ordinates indicate the specific gravity. The directrix A-B at any point intersecting the vertical line in the abscissa gives the percentage

DIAGRAM No. II.

Percentage of silver.



of the alloy, and at the intersection of the horizontal line with the ordinate, the average specific gravity for the alloy found. The dotted line indicates in the same way the actually ascertained specific gravity for the alloys lying vertically below. The maximum point of the deviation shows the position of the alloy, which must be regarded as the cause of the deviation. This may be the formation of a eutecticon, or of a chemical combination whose presence in a greater or smaller percentage brings about the degree of the deviation of the specific weight from the average of the components.

Now, if the actual behavior of the alloys of from 1 to 100 per cent. be noted, and the results listed in a system of co-ordinate lines in which the ordinates indicate the specific gravity of the components and the abscissæ their percentage, a diagram is obtained for tin-silver alloys as shown in diagram No. II. The directrix Ag-Sn indicates the normal average weights. All points lying below the directrix indicate a diminution of specific gravity or an increase in volume; all points lying above the directrix, higher specific gravity or contraction of volume.

As to the application of these indications in determining combinations or eutectica, precaution demands the execution of parallel investigations by microphotography or by thermal methods in order to avoid miscalculations. I shall therefore in the subsequent mention of works on this subject revert to the previously obtained results for the sake of comparison.

From the compilation of tin-silver alloys which I have examined (see table opposite) it is evident that within the limits of amalgams of practical value for dentists I have laid special stress on the presence of stœchiometric conditions. My diagram shows the justification of this method.

As early as 1895, Burchard (⁶), and even before him (1895) Kirk (⁵), emphasized the necessity of mixing amalgams in chemical proportions. Un-

fortunately, Black in his second publication has not availed himself of the many valuable hints which these two authors had given him.

In the table of my results (see opposite page) and in the diagram (No. II) drawn from this table, the relative gradations of 5 per cent. each on an average are chosen. In the alloys of from 25 to 66 $\frac{2}{3}$ per cent. of silver the percentages of the atomic weight have been figured out, and concessions have been made for the purpose of securing stœchiometric conditions. In the diagram as well as in the table the chemical formula approximately corresponding to the proportions has been noted. I expressly emphasize, however, that I do not mean to thereby indicate the actual accomplishment of these combinations.

In addition, the table contains the dry weight, the relative and the absolute average, and the absolute actually ascertained specific gravity. By the addition of the volume in cubic millimeters I believe that I have facilitated the control for every reader. I lay great stress upon this explicitness, because I frequently miss the possibility of control in Black.

In the table, instead of the volume the weight is given, and in column VI only the increase or decrease of the specific volume in cmm.

To this table I must add some explanations. In the 10 per cent. as well as in the 95 per cent. I have inserted the mean derived from two calculations, since the union was not completely homogeneous. The 80 per cent. alloy, probably owing to the loss of tin in melting, has deviated from the directrix. It is also possible that the 75 per cent. and 73 per cent. alloys F are located not entirely correctly, since the point ascertained for the 80 per cent. alloy lies in a straight line with the 72.5 per cent., 85 per cent., and 95 per cent. alloy. The calculation of the 20 per cent. alloy yields the too high figure 7.9. Time forbids, however, for the present, the correction of this evident mistake in alloying. I have therefore made the re-

sult to summarily harmonize with the others.

Prompted by scientific interest, I have also investigated the tin-silver alloys

I had expected that the point of expansion of the 5 per cent. alloy, analogously to the lowering of the fusing-point, would exceed the volume of the

TABLE OF TIN-SILVER ALLOYS.

I.	II.	III.	IV.	V.	VI.	VII.
Alloys in Percentages by Weight.	Dry Weight.	Specific Gravity.	Volume.	Average Specific Gravity.	Actual Specific Gravity Found.	Difference in Specific Gravity.
	GM.	GM.	CMM.	GM.	GM.	CMM.
Ag 5, Sn 95	3.384	2.9285	455.5	7.450	7.420	+30
Ag 10, Sn 90	a6.7366 b3.8788	a5.834 b3.368	a902.6 b510.8	7.610	7.530	+80
Ag 15, Sn 85	7.122	6.196	926	7.770	7.68	+90
Ag 20, Sn 80	5.7145	4.995	719.5	7.932	7.810	+122
Ag 23.3, Sn 67.7 =Ag ₃ Sn ₃	6.2355	5.4465	789	8.030	7.903	
Ag 31.34, Sn 68.66 . . . =Ag ₂ Sn ₂	19.386	17.017	2369	8.296	8.183	+113
Ag 37.8, Sn 62.2 =Ag ₂ Sn ₃	21.1407	18.6315	2509.2	8.503	8.425	+78
Ag 40.2, Sn 59.8 =Ag ₃ Sn ₄ (Black)	(?)	(?)	(?)	8.570	8.500	+70
Ag 42.7, Sn 57.3 =Ag ₉ Sn ₁₁	7.8017	6.891	910.7	8.680	8.566	+114
Ag 47.7, Sn 52.3 =Ag ₂ Sn	6.1125	5.4145	698	8.821	8.756	+65
Ag 52.57, Sn 47.43 . . . =Ag ₁₁ Sn ₉	9.5755	8.505	1070.5	8.978	8.944	+34
Ag 57.8, Sn 42.2 =Ag ₃ Sn ₂	12.0147	10.7015	1313.2	9.145	9.145	0
Ag 64.47, Sn 35.53 . . . =Ag ₂ Sn	10.7855	9.6335	1152	9.359	9.362	-3
Ag 70, Sn 30	8.0785	7.2380	840.5	9.537	9.611	-74
Ag 72.5, Sn 27.5	7.1204	6.3952	725.2	9.617	9.818	-201
Ag 73, Sn 27 =Ag ₃ Sn (Black)	(?)	(?)	(?)	9.630	9.814	-184
Ag 75, Sn 25	6.3604	5.7135	646.9	9.697	9.832	-135
Ag 80, Sn 20	7.9524	7.1573	795.1	9.858	10.0	-142
Ag 85, Sn 15	12.485	11.255	1230	10.018	10.150	-132
Ag 95, Sn 5	a6.8457 b5.646	a6.1813 b5.104	a664.4 b542	} 10.339	10.369	-30

which lie above and below the mixture proportions which specially concern the dentist; for it seemed important to me to compare my results with the curves of solidification of Gautier ⁽¹⁰⁾ and of Heycock and Neville ⁽¹¹⁾.

tin. This expectation was, however, not fulfilled, since the maximum of expansion lies in 23.3 per cent. of silver.

In the diagrams of the above authors the lines from 57.8 to 64.4 per cent. are not covered; these my diagram shows.

The point of intersection there lies at 80 per cent. I therefore surmise that a revision of my results with a painstaking exclusion of all sources of mistake—which is possible to only an imperfect degree in a small private laboratory—will enable me to ascertain the point of intersection. This is, however, only a conjecture.

Briefly summing up, my investigations prove—

(1) An increase of expansion in volume of all tin-silver alloys up to a maximum of 23.3 per cent. = 25 per cent. of atomic weight = Ag_3Sn_3 .

(2) A decrease of expansion up to 57.8 per cent. of silver.

(3) An equilibrium of from 57.8 to 64.4 per cent. of silver.

(4) An increasing contraction in volume of from 64.4 to 72.5 per cent.

(5) A decreasing contraction in volume of from 72.5 to 100 per cent. of silver.

These results, moreover, and the diagram drawn from them, do not entirely agree with the final conclusions of Behrens⁽⁸⁾ and Charpy⁽⁹⁾, which I have discussed in my previous article⁽¹⁾ first referred to. Charpy assumes eutectica for all alloys up to 65 per cent. of silver, while Behrens finds seven chemical combinations. My diagram only allows a conclusion to be drawn as to two combinations or eutectica; the one on the part of the tin, Ag_3Sn_3 , the other on the part of the silver would correspond to the formula Ag_3Sn .

In the position of equilibrium at about 60 per cent. two interpretations are possible: Either pure tin and silver crystals are present there, or—which I consider more probable—a mixture is present of the upper with the lower eutecticon or alloy.

In this case the ratio of mixture would be determined on one side by the distance of the medium point of equilibrium to the maximum point of oscillation. The position of this point shows that the energy of the expansion in volume of the alloy Ag_3Sn_3 stands in the ratio of 38:12—or, in round figures, of 3:1—to the

energy of contraction. Since the contraction of the alloy Ag_3Sn is equal to 201 cmm., as contrasted with 127 cmm. of the expansion in Sn_3Ag , the energy of the action of both by no means corresponds to the quantity of their properties, since the expansion, which amounts to only $\frac{5}{8}$, exerts a triple influence. Consequently we figure the energy of the 23.3 per cent. alloy to be $\frac{3 \times 8}{5} = \frac{24}{5}$, or in round numbers five times that of the 73 per cent. alloy.

It is therefore natural to assume that in the 23.3 per cent. alloy we have a combination of a higher order, consequently probably a chemical combination, as over against a eutecticon in the 73 per cent. alloy. This question must, however, remain open for parallel investigations.

The diagram can also be practically applied in the analysis of tin-silver alloys, thus:

If we determine the dry weight = t of an alloy, and then weigh the same specifically, the difference found in milligrams represents the volume in cubic millimeters. The dry weight divided by the volume gives the specific gravity = G , therefore $G = \frac{t}{v}$. The specific

volume is then $\frac{1}{G}$. We then seek the specific gravity found in the ordinate of the diagram, and erect at this point the horizontal line. From the intersection of this horizontal line with the curve of the specific weight found, we draw the vertical line to the abscissa, where we can read off the composition of the alloy.

For dental amalgam alloys this method is also applicable as an approximate estimate, since most admixtures besides silver and tin are usually present in small percentage, and the specific gravity of most of these admixtures keeps about the medium between silver and tin (Cu 8.9, Cd 8.7, Bi 9.9). Only gold and platinum considerably raise the specific gravity, yet these two metals—which not alone in this relation but also in others disturb our amalgams if added in any great quantity—can be easily traced.

A communication of Kahlbaum and Sturm (⁷) is also worthy of note. They have proved that the specific gravity of pure metals according to the preceding treatment may undergo small changes (oscillations). These are so small as to be of no significance here. Yet these observations are of importance in explaining to us the apparently mysterious quality of aging (*cf.* Black), which can be easily interpreted as a physical phenomenon.

In conclusion, I would again emphasize that only a study of the most minute details will furnish us with a conception of the nature of our amalgams, and that we must begin at the very foundation if we are to have this department of our science understood scientifically.

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THE SURGICAL AND THERAPEUTIC ASPECT OF MAXILLARY READJUSTMENT, WITH SPECIAL REFERENCE TO NASAL STENOSIS, HARE-LIP, CLEFT PALATE, AND SPEECH.

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(Read before the Pennsylvania State Dental Society, at its annual meeting, Philadelphia, June 30, 1908.)

LONG ago, by many writers, with countless variations and in an almost endless chain of etiologic theories, the terms "arrested development," "excessive development," and "perverted development" have been used with reference to every form of asymmetrical or otherwise unusual bodily development.

The net result of one or more of these conditions affecting the oral cavity is irregularity. This is equally true of the

nose and of other associated parts accessory to this region, as it indeed pertains more or less indirectly to more remote parts or to the human organism as a whole.

In harmony with these facts, we find it also true that, with irregular dental arches and deformed palates, a defective nasal form or development is always present in greater or minor degree.

It therefore follows that etiologic factors leading to abnormalities of one of

these interrelated parts must cause defective if not pathologic conditions of the other. Axiomatic as these statements may appear, it is nevertheless true that their full significance has not yet been appreciated by dentists, oral surgeons, rhinologists, neurologists, general surgeons, and general or other special practitioners of medicine—for the results of their surgical and therapeutic application might and should be made manifest in every division of medical practice.

Through the study of the grosser deformities of hare-lip and cleft palate, of the effect upon the development of the nasal septum and other intranasal structures, of mal-directed force expressed through abnormal muscular action and unnatural breathing, as well as arrested development and consequent malformations due to early compression of the maxillæ of infants in an effort to close the palate, and by the study of other factors leading to an increase or decrease of deformity, which are, as might be expected, more apparent in the extremely marked types of asymmetrical development, it has become apparent to me that by the rearrangement of the maxillary bones much might be done that could not otherwise be so well accomplished. I believe this to be true with regard to dental irregularities also, and that by this means a large proportion of orthodontic procedures now practiced would be rendered quite unnecessary.

Whatever the etiologic factors may be, or however well they may be explained, the fact remains that with deformities such as deflection of the nasal septum, spurs, and other conditions which bring about partial or complete nasal stenosis, as with most dental irregularities, the one great requirement in attempting cure with larger breathing-space is, more room for the oxygenation upon which healthfulness of the more or less hypertrophied tissues depends, and more room for erupting tooth-crowns.

Authors in this country and in Europe have devoted much thought to causal factors of deviated nasal septum, of intranasal deformities, adenoids, enlarged tonsils, crowded dental arches, dental

irregularities, and other abnormal conditions in these regions so frequently found in the same individuals.

The dental irregularities and the high, narrow palatal vaults have been ascribed to the adenoid vegetations and to the nasal defects which caused mouth-breathing, and again, adenoids and enlarged tonsils have been attributed to dental irregularities. The adenoid vegetations have been held to be entirely due to want of nasal breathing and insufficient oxygenation. Some authors have associated these defects with heredity, and to that have laid all the associated ills, to the complete exclusion of other factors, such as imperfect physiologic respiratory effect, abnormal muscular action, and the influence of other factors directing or misdirecting developmental processes. In short, from thumb-sucking and accidental injury to the more complicated embryologic and physiologic factors the way has been paved with theories—all more or less correct, but each in itself insufficient to cover all these conditions.

A careful scrutiny of nearly all such patients will usually reveal other abnormal features; sometimes remote parts of the body are found unequally or at least asymmetrically developed. These deformities, therefore, could not result from any of the etiologic factors that apply only to local conditions, and some general law governing a tendency toward irregular cell-development must be active as the first factor in nearly every instance.

While adenoid vegetations are usually and apparently almost necessarily associated with mouth-breathing and with imperfectly developed nares, the fact which I have noted in former papers, namely, that in individuals with cleft palate, even in those with wide fissures throughout, one quite commonly finds masses of adenoids and much-enlarged tonsils, demonstrates that in such cases, at least, restriction of the nasal space did not cause the vegetations.

On the other hand, the effect of muscular action in mouth-breathing, thumb-sucking, and other factors of this character cannot be denied or ignored, any more than one could say that hard labor

would not show its effect upon the shape of the hands, or that any organ or part of the body would not atrophy from disuse or become larger and stronger by exercise.

Malocclusion, of course, is an all-important factor, but malocclusion presupposes erupted teeth in order that there may be occlusion of any kind whatever. Unless there were some earlier factors which disarrange the erupting tooth-crowns or crowd them out of place, there would be no malocclusion—that is, except in a comparatively limited class of cases.

The various operations suggested for the correction of intranasal deformities, such as the Asche operation, the so-called window operation as practiced by Freer, Ballinger, and others, removal of spurs, etc., while frequently and successfully performed in skilful hands and giving a greater or smaller amount of relief, are nevertheless somewhat limited in their usefulness. There would seem to be no room for argument with regard to the statement that if the external walls of the nares can be moved apart, to the end that the breathing-space may be thus enlarged, and if this operation be accomplished by sufficiently harmless methods, the result would be very desirable and highly beneficial. Such operations I have performed for a number of years on patients that had been referred to me by rhinologists.

By the application of a force at once simple, direct, and effective, we are able to get a positive and prompt result. The appliance used (as seen in Fig. 2) consists of bands attached to the canines and molars on each side, and so joined that when a bar with screw and nut is attached across the palate in the bicuspid region, the force applied by turning the nut will cause pressure against all of the teeth upon each side of the dental arch. By the aid of pressure which is so gently applied that there is no pain and but little inconvenience for the patient, it is possible in all young persons to force the maxillaries apart by separating the median suture extending between the central incisor teeth and on

through the central portion of the hard palate. This method is also practicable in older persons, as is shown in our illustrations.

Evidence of this is given by the fact that the central incisors are moved apart without an attachment or a direct pressure of any kind being applied to these teeth.

So easily is this accomplished that members of the family usually turn the nut at home, and it frequently happens that I never see patients that live far away from my office from the time of insertion of the appliance until completion of the separation.

With such a separation of the maxillary bones the nasal processes, as might naturally be expected, and the nasal bones through their points of attachment, are moved, thus affording a direct and immediate increase of space within the nares.

With many dentists, particularly orthodontists, it is a common practice to enlarge the upper dental arch in the correction of dental irregularities, and much benefit to the nose as well as to the mouth is usually accomplished; but in all appliances commonly used by dentists the pressure is chiefly applied in such a way as to cause an osteoclast absorption of surrounding bone. This has been clearly demonstrated by Dr. Talbot in his experiments upon dogs, upon whose teeth he placed regulating appliances. It was also proved by microscopic sections of jaws and teeth taken after pressure had been applied for a sufficient time. To get the best result, however, this is exactly what should not take place. By such immediate and direct pressure as is exerted by the appliances I use, through the marked resistance of the more rigid portions of the maxillary bones in the region of the malar processes, just the right contra force is applied to make the effect extend into the higher regions between the maxillaries. Direct proof of this can be given in many ways, as the following examples will show:

In the skull here shown (see Figs. 1 and 2) the diameter across the base of the nose, between the points marked,

measured before and after pressure, was increased one-eighth inch, and across the

In one of the cases illustrated (Fig. 3), that of a young man aged twenty-

FIG. 1.



FIG. 2.



upper third of the nose one-sixteenth inch.

nine years, whose nose was injured by a base-ball in early youth, a rhinologist,

Dr. Nelson M. Black, by whom the patient was referred to me, found the following intranasal condition: "Marked deviation of the septum; almost complete stenosis on the affected side."

The appliance was adjusted on April 6, 1908. Within two weeks the space between the central incisors appeared as shown in Fig. 4, and an actual enlargement of the nares was confirmed on

space was secured promptly and effectually. To these illustrations might be added a long list of other patients who, with precisely the same result, have received the same treatment in my practice during the past few years; the repetition, however, by citation of other examples is not necessary. All of these cases show a deviation of the nose from the central facial line—an imaginary

FIG. 3.

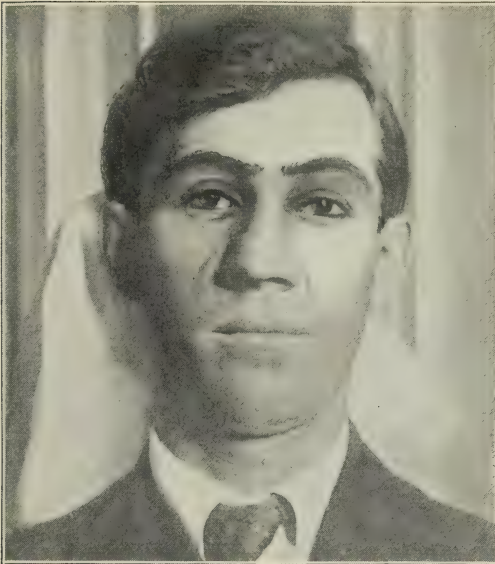


FIG. 4.



examination by Dr. Black, as well as by the improved breathing experienced on the part of the patient himself, thus proving that even at this age the desired result had been quickly accomplished. Most of the time the patient, who resides in another city, was absent, and had the nut of the appliance turned by one of the members of his family.

The next illustration (Fig. 5) shows a young man of twenty-one, whose central incisors present the same separation, and for whom the maxillaries were parted with marked improvement in the nasal width in approximately two weeks' time. The other illustrations were taken from patients referred to me by rhinologists. For all of these patients the desired nasal

though clinically very useful line to which I have previously called attention, and which runs through the center of the forehead, the tip of the nose, and the center of the chin. Deviation from this line in one way or another is a fairly certain indication of perverted nasal and maxillary growth, leading almost invariably to pathologic intranasal conditions.

Especially among growing children who have been treated by this method there has been a marked physical improvement, and an increase in weight has been the almost uniform result. Many of them had previously been unable to attend school regularly on account of the tendency to nasal, pharyngeal, and bron-

chial affections. Nervousness was almost invariably very greatly relieved. This is believed to be due to two reasons: (1) The breathing apparatus is improved along with the improvement in general health to be expected from better aeration and freedom from diseased nasal secretions; and (2) That condition to which Kiernan has called attention is removed, caused by the crowding together of the dental arches with a tendency to nerve irritation which quite fre-

ment can be made a very important factor in safeguarding against tuberculosis. It is so easily accomplished, and the results are so greatly beneficial, that it should be applied to the hundreds and thousands of growing children who are unquestionably more susceptible to pneumonic and bronchial affections by reason of the difficulties under which they labor from an imperfect breathing apparatus. This treatment offers a possibility of relief that is specially important in view

FIG. 5.



quently manifests itself not only in increased nervousness of a general character, but also in the development of neurotic tendencies leading to chorea, epilepsy, and other similar affections. These affections, in some instances at least, might probably have been averted if these patients could have been tided over the critical periods in their development. This has been recognized by Dr. Talbot, and the periods are named by him the periods of stress. It is certainly a curious fact that even with the disadvantage of having the appliance in their mouths and the bar across the palate, such children have a tendency to become less nervous, have an increased appetite, and show a general advance in development almost from the very first few days after the pressure has been exerted.

I cannot help feeling that this treat-

of the well-known increasing instances of deformities—arrested development in the maxillary region being more marked in each generation under the influence of conditions created by our so-called civilization. After all, the total sum of advanced treatment of tuberculosis may be expressed in a few words: more and better air, more and better food. Since hare-lip and cleft palate are merely different and more marked forms of oral, nasal, and labial deformity, it naturally follows that maxillary readjustment might be expected to yield valuable results also in these affections. Maxillary readjustment has thus become an essential part of the system of treatment which I follow, and large numbers of otherwise practically hopeless cases have been successfully corrected.

Among the varieties of cases of cleft

palate requiring this treatment, we find the following:

First: Congenital forms of associated hare-lip and cleft palate, with characteristic deformity before any operation whatever has been performed.

Second: Infants on whom lip operation has not been performed so as to prevent the increase of the deformity by bony fixation of the deformed part.

Third: Older persons and children with fissures through both the hard and soft palates too wide, and with the arch of the palatal walls too flat to admit of successful closure by methods of operation such as are usually employed.

Fourth: Cases in which as a result of early ill-advised operation there has been an arrested development of the upper jaw with consequent irregular eruption of the teeth in such a manner as to crowd them toward the center of the mouth, thus reducing the size of the palate, but in which no erupting germs of teeth have been injured, the full number of teeth being still present.

Fifth: Cases in which the passing of sutures through the maxillary bones in early infancy, or undue compression, has interfered with the development to such an extent as to prevent the affected teeth from erupting.

My method of treatment of cases of class No. 1 has been fully described in previous papers, therefore it is unnecessary to go into the detail of this treatment, but the principle of the various steps may be summed up in the statement that before a radical surgical operation of any kind is attempted, an effort must be made to readjust the deformed parts by simple and natural means, to the end that later operations may be simplified and accomplished more naturally.

In class No. 2 it is not practicable to restore the premaxillary to its proper position between the other divisions of the maxillary bones by pressure without surgical intervention, as is usually practicable with class No. 1, because of the fact that in many of these cases delay has allowed the formation of too resistant bone. This delay has also

brought about such a perverted form as to require the fracture of the deformed bony parts and the readjustment with wires acting as splints and holding the parts in proper position until union has taken place. Sometimes it is necessary to remove the excessively developed portion of the permanently deformed vomer in order that the premaxilla and the nasal septum with the cartilaginous parts of the nose may be placed in as nearly their normal relation as possible. Of these cases we might quote and illustrate many examples, but the treatment which they require is so obvious that a detailed description is unnecessary.

Class No. 3 comprises cases of cleft through the hard and soft palates in which, by reason of arrested development or of forcing apart the sides of the palate—through the fact of the opening extending throughout—the palatal walls on each side of the fissure are so narrow and ill-developed and the fissures so wide that in performing muco-periosteal uranoplasty and staphylorrhaphy, the flaps would be so scant as to preclude the possibility of their being joined in the median line without too much tension and without such injury as would interfere with the circulation and thus tend to sloughing. In other words, cases that would commonly be classed among those beyond the limit of favorable indication for ordinary methods of operation can be reduced to conditions whereby complete and perfect closure of the palate is possible, by the use of an appliance quite similar to the one used in separating the maxillaries, save that it is so constructed as to exert pressure in an inward instead of an outward direction. Moreover, with the sufficient abundance of tissues gained by reason of the narrowing of the palate, good speech can be rendered possible. In one such case, as shown in the illustration [exhibiting], the fissure was so wide in the beginning that it was generally admitted that a closure could be made only by means of some sort of artificial substitute. The next illustration, however [exhibiting] shows that the cleft has been perfectly closed, and the patient is a living evidence of the fact that at

twenty-two or twenty-three years of age this operation may be accomplished, with reasonably good speech as a result.

To prevent the narrowing of the nares which might be expected to occur from the use of force applied in an opposite direction from that employed when widening of the nares is desired, it is necessary to cut through the external plates of the maxillary bones, and particularly through the malar processes and back of the tuberosities, so that the sides of the jaw will yield and allow the narrowing of the palate without compression in the nasal region.

For patients upon whom closure or attempted closure of the palate fissure has been performed according to well-known methods by forcibly crowding together and wiring the maxillaries, something must be done. This class is apparently increasing, because of the fact that children so treated in infancy are now reaching an age when the disastrous results are noticeable.

As an example of this class a series of cases may be presented which illustrate very fairly some of the unfortunate conditions that require correction before these individuals can ever hope to enjoy the benefits of the good speech, appearance, and health which are their birthright, and which they would enjoy in a much greater degree had other methods of treatment been pursued.

Case I. An infant of approximately one year of age, with double hare-lip and cleft palate. In this case shortly after birth wires had been passed through the maxillary bones and across the anterior and posterior portions of the fissure, lead plates adjusted, and the wires twisted in an effort to bring the tissues into contact upon each side of the fissure. The practice of closing the palate first and the lip afterward had been followed. The suffering of this infant was described as having been very great; death was narrowly averted. The palate was only partly and very imperfectly closed, and, as might have been expected, the projecting premaxilla was thus permanently crowded out of its rightful place, the face being hideously nar-

rowed, and it could only be expected that future development would emphasize the deformed face, nose, mouth, and palate. Any attempt at future correction could only be made in the direction of modifying the malformation, since such results with regard to both speech and appearance as might have been attained if the lip had been first properly closed with the premaxilla in its proper place were absolutely impossible.

Case II. A boy [exhibiting] who came under my care eight years after five previous operations had been unsuccessful. The original deformity was single hare-lip and cleft palate, and the first operation performed was of the character already described for case I. The attempted closure of the palate fixed the maxillaries in such an abnormal position that the surgical conditions incident to lip-closure were undoubtedly rendered more difficult, the result of which was that none of the five operations, the last two of which had been performed by a most skilful surgeon, was sufficient to give the desired result, and it was necessary for me to re-operate upon both lip and palate in separate operations before an improvement in speech and appearance could be secured.

Case III. An infant [exhibiting] for whom a closure of the palate fissure was first attempted, the case being one of a single hare-lip and cleft palate, by the method described for case I. This child at nearly two years of age has a marked depression in the anterior portion of the upper jaw; almost no teeth are erupting. We therefore know that this deformity will become more apparent with advancing years.

Case IV. The illustration (Fig. 6) shows the girl patient as she was at one year of age after a similar operation upon her palate had been performed at two months of age, and her lip having been closed at the same operation. As frequently occurs in such cases, through the inability to care for the lip and the palate when both are closed at the same time, the lip sloughed from the cartilaginous wing of the nose down to the angle of the mouth on that side. Fig. 7 shows

the same little one as in Fig 6, after operation.

Case V. A little girl of two years of age [exhibiting], for whom in early

side. The entire anterior portion of her face in the region of the upper lip and the nose is depressed and deformed, and there is no indication of erupting teeth

FIG. 6.



FIG. 7.



infancy the same kind of operation was performed as for case III, with exactly the same result, and though the patient was one year older, nearly all the deciduous upper teeth have failed to erupt, nor is there any evidence that they ever will erupt.

Case VI. A little boy of four years of age [exhibiting], whose case I have previously reported, upon whom the same kind of operation was performed as in cases IV and V in early infancy, and with the same result.

Case VII. The illustration (Fig. 8) shows the mouth of a young girl now thirteen years old, who had three successive unsuccessful operations performed upon her palate and lip in early infancy. The picture needs no elaboration. It speaks for itself. There is less than half an inch of space between the permanent central incisor and the first molar on one side, and but little more space between the same teeth upon the other

to give hope of future developmental improvement.

FIG. 8.



Case VIII. A boy, eight years old [exhibiting], whose palate was closed

in early infancy with apparently good result. When he came under my charge his upper arch was so contracted that some of the permanent teeth had erupted almost in the central portion of his palate. Nasal catarrh was very marked on account of intranasal deformity, middle-ear disease had caused deafness in one ear, and a mastoiditis had already been treated by operation. Even approximately correct speech was, of course, impossible, there being a chronic nasal obstruction and insufficient room for the tongue to perform its normal functions in producing speech.

Case IX. A boy of about eight years of age [exhibiting], with almost precisely the same condition and with a practically identical clinical history as

the one in case VIII, except that no mastoid operation had been performed. Yet in both of these cases the operation at the period of infancy appeared to be successful.

Where, if not in such a body as this, could one hope to appeal for the correction of pathologic conditions that lie at the very door of the profession crying for relief? To whom may we look in the evolution of the broader, greater scientific possibilities of oral treatment, if not to the members of the society of that state which claims for its home the city of Philadelphia, the birthplace of modern oral surgery—the home of Garretson? With these thoughts in mind, I thank you.

SYPHILIS IN ITS RELATIONS TO DENTITION.

By Dr. JOSEPH CAVALLARO, Florence, Italy.

(Continued from vol. 1, page 1344.)

(III.)

RELATIONSHIP BETWEEN DENTAL EROSION, INTERSTITIAL KERATITIS, AND DISTURBANCES OF HEARING. (HUTCHINSON'S TRIAD.)

TO Jonathan Hutchinson the merit is due of having established the famous triad which rightly bears his name as the syndrome of hereditary syphilis.

He noted that in hereditary syphilitic subjects disturbances of the eye, ear, and teeth are found, together or singly, and came to the conclusion that when in a subject dental erosions, interstitial keratitis, and disturbances of the ear (purulent otitis media, deafness) are present, one can make the diagnosis of hereditary syphilis. This theory was accepted and is still accepted today, all clinicians agreeing on its diagnostic value. The

triad, however, does not always present its three characteristic lesions—often but one or two are present.

The relative frequency of the three kinds of dystrophic stigmata as demonstrated by Hutchinson is illustrated by the following statistics collected by Sidler-Huguenin in 125 cases of hereditary syphilis:

Interstitial keratitis	74 cases
Hutchinson's teeth,	55 "
Alterations of the ear,	20 "

According to statistics of Professor Fournier, collected from 247 observations:

Ocular lesions,	107 cases (43 per cent.)
Dental dystrophies,	97 " (39 " ")
Auricular lesions,	36 " (14 " ")

The statistics of E. Fournier, comprising 233 cases, show the following figures:

Ocular lesions,	114 cases (48 per cent.)
Dental dystrophies, 110	" (47 " ")
Auricular lesions, 44	" (18 " ")

Dental dystrophies are of great importance in their relation to the triad and to the other hereditary syphilitic lesions.

The relationship between the dental lesions and the ocular and auricular lesions, according to the author's own observations, is as follows: In 37 cases with dental lesions, ocular lesions were found twenty-five times (74 per cent.), auricular lesions nine times (25 per cent.).

Hutchinson's first observations have been somewhat supplemented. A number of other dental deformities, for instance, which had not been observed or recorded by the great English physician, have been added to the crescentic tooth. To the disturbances of the ear, dry otitis, various symptoms of fulminant deafness, and an attenuated form of progressive deafness have been added. To interstitial keratitis, the lesions of the iris and of the fundus of the eye, the ophthalmoscopic stigmata described in so masterly a manner by Antonelli, have been added. All these new studies and observations tend to show that in the alterations of the eye, as well as in the dental or auricular alterations, lesions are found which are characteristic in themselves and pathognomonic of hereditary syphilis. In the following paragraphs we shall give a brief *résumé* of the triad.

AURICULAR STIGMATA.

Disturbances of the ear are not infrequent in hereditary syphilis. According to Hutchinson and Jackson there are ten cases of deafness in every 100 syphilitic subjects (1:10), or according to Fournier, from fourteen to eighteen per cent. The internal ear is particularly often the seat of one of the most serious manifestations of tardy hereditary syphilis, namely, fulminant deafness, which in a short time becomes complete. Omitting the lesions of the ex-

ternal ear, which do not concern our subject, we shall emphasize the lesions of the internal ear, *i.e.* profound fulminant deafness, purulent otitis media, in their relation to hereditary syphilis, as these lesions belong to the triad.

Purulent otitis media is ordinarily found during the first period of life; otitis interna begins from the eighth to the twentieth year according to Hutchinson, Lancereaux, Pierce, and Davidson, and is found more frequently in women. Otitis media generally depends on premature hereditary syphilis, otitis interna upon tardy hereditary syphilis. The anatomical lesions of the internal and median ear in hereditary syphilis have been studied very little and insufficiently, perhaps on account of the difficulty of the decalcification of bone and of the small amount of material available.

In the tympanic cavity different degrees of inflammation are found, which vary from a little serum to a plastic, purulent exudate and a generalized supuration with perforation of the tympanic membrane and destruction of the ossicles, followed by defects in hearing, by osteo-periostitis of the wall of the tympanic cavity, mastoid abscess, phlogosis of the petrous portion of the temporal bone, of the sinuses, etc., and by necrosis of the labyrinth. One may even find synechiæ between the organs in the tympanic cavity, and especially in the membrane near the promontory.

Symptomatology. Clinically, chronic otitis media in such cases presents special characteristics. It develops suddenly, especially in very young subjects with hereditary syphilis, a few weeks or months after birth, without local or general reaction, without fever or pain. It easily becomes chronic if not properly taken care of, and then is very persistent though quite painless. Often it develops into lesions of the bony walls and necrosis of the petrous portion of the temporal bone. This lesion is unilateral or bilateral. If bilateral it is very serious, as it affects especially children below seven or eight years of age, who in consequence may become deaf and dumb. Sometimes, however, it may be found

in older subjects, as in the case observed by Hennebert, which is also interesting on account of the peculiar appearance of the tympanic membranes, suggestive of interstitial keratitis.

Besides purulent otitis media, Gradenigo considers as syphilitic—

Dry otitis, which is sometimes accompanied by interstitial keratitis and dental malformations, but is also found alone as a single sign of hereditary syphilis. It is characterized by rapid progressive deafness, sometimes extending to the internal ear, and by an attenuated form of progressive deafness, which has the character of chronic catarrhal otitis media and quickly extends to the labyrinth.

Labyrinthitis. The morbid process as developed in the internal ear may be said to be quite unknown; we can suppose that the lesions of the labyrinth in hereditary syphilis are similar to the ones found in acquired syphilis, *i.e.* hyperemia of all the parts, especially in the cochlea, hemorrhage in the membranous lamina of the borders, in the remotest part of Corti's canal, infiltrations, exostosis, alterations of the vascular walls. The vascular alterations appear to be the commonest.

It is important to remember that the arteries of the internal ear are subject to sclerosis, as in tertiary syphilis. Baratoux has in one case observed an obliterant arteritis of the vessels of the labyrinth.

At times connective-tissue hypertrophy, atrophy and destruction of the functioning epithelium and in an advanced stage calcareous infiltrations and neoformations of bony tissue may occur.

The auricular lesion can be unilateral or bilateral. Generally it involves both sides, and the bilaterality may be simultaneous or successive, similarly to what occurs in parenchymatous keratitis. The course and the malignancy of the disease vary according to the intensity of the syphilitic infection.

According to Gradenigo there are three forms of syphilis of the labyrinth:

(a) *Labyrinthitis slowly developing.* The beginning is insidious. Sounds are

hardly perceptible; dizziness is rare. Deafness comes very slowly.

(b) *Labyrinthitis rapidly developing.* This is the commonest form. Its beginning and evolution are rapid. It is characterized by subjective sounds, and is soon followed by deafness and by a state of dizziness. It may be unilateral or bilateral.

(c) *Labyrinthitis suddenly developing, apoplectic and fulminant.* Deafness in this form is fulminant. Politzer has noticed a case of complete deafness three days after the first disturbance in hearing. The lesion is generally bilateral. It may cease or improve. It develops suddenly without any lesion of the external and middle ear. It is characterized by painful hyperacusis, not responding to treatment, with nocturnal irritations; by a marked diminution of hearing, daily increasing to complete deafness (fulminant deafness); by a marked diminution or complete loss of cranial perception; by an indistinct or entirely lacking perception of sounds; by the clinical absence of lesions which would aid in the diagnosis, and by its almost constant resistance to the specific treatment. De Haan in his "Surdité bilatérale complète due à la Syphilis héréditaire, 1884," describes a case of loss of hearing in one single night.

Labyrinthitis is often accompanied by irido-choroiditis, and the two diseases combined rapidly produce blindness and deafness; generally, however, it is accompanied by interstitial keratitis, which precedes it by a few weeks or more.

The pathogenesis of syphilitic deafness has not yet been explained. Hutchinson admitted a lesion of the auricular nerve similar to syphilitic neuro-retinitis, with white post-neurotic atrophy. Others, on account of the simultaneousness of the bilateral lesion, admit an alteration of the floor of the fourth ventricle; Baratoux advances a vascular theory, and we are awaiting a final decision from future studies and observations.

We may even be dealing with progressive deafness, generally depending upon sclerosis of syphilitic origin. As a con-

sequence of syphilitic deafness we may even have dumbness, which we can especially well understand if the deafness occur during the first years of life. The hereditary syphilitic patient becomes dumb because he has become deaf.

OCULAR STIGMATA.

Interstitial keratitis. The ocular stigmata are the most numerous, most important, most characteristic and commonest lesions in hereditary syphilis, and contribute much in the investigation of this disease. Besides interstitial keratitis as described by Hutchinson, modern studies have revealed a number of other lesions in the eye depending upon hereditary syphilis. Fournier classifies them as follows:

- (1) Strabismus.
- (2) Ocular stigmata and relics of lesions in the cornea, the iris, and the fundus of the eye.
- (3) Functional disturbances of the ocular apparatus (nystagmus, strabismus) or of the sight (congenital amblyopia, hemeralopia).
- (4) Malformations in exceptional cases.

Interstitial keratitis is characterized by a diffuse haziness, which first affects the cornea of one eye and later that of the other. If this haziness extends over the entire cornea and is malignant and binocular, blindness may ensue, which is generally transitory and lasts on an average from three to six months. This form of keratitis, even in its relics, can be differentiated from common keratitis as follows: The opacities are more or less deep, not superficial, an absence of facets or epithelial depressions is found, and an habitual persistence for some years at least of a fine vascular reticulum, sometimes of one or two little vessels in the deep parts of the cornea. The anatomical pathological lesions are represented by infiltrations of the parenchyma of the cornea and by neoformations of vessels. Sometimes also the iris and the choroid take part in the morbid process, and this uveitis may represent the relapse of an old process, because

often parenchymatous keratitis appears in eyes which have already borne stigmata of an old iritis or choroiditis, evolved during intra-uterine life or during the first period of extra-uterine life.

Antonelli believes that parenchymatous keratitis is generally, if not always, secondary to such lesions of the uveal portion, especially of the anterior part (ophthalmoscopic examination of the ora serrata, by Trantas' method).

In keratitis there are no serious symptoms of irritation nor pains. The lesion may last for two or three months, even for two years or more. It affects both eyes, simultaneously or successively. Sometimes it entirely disappears, in other cases it leaves marks on the cornea, diffused turbidity, vascular relics, etc.

Keratitis may manifest itself between the second and the twentieth year of life or even later, but it often appears between the eighth and the fifteenth year. It might appear to be of toxic or dyscrasic (Panas) origin, and according to Fournier belongs to the para-syphilitic lesions, but the modern researches concerning the spirilla and into the presence of spirochæta in their different manifestations of congenital or acquired syphilis modify this view and suggest the bacterial nature of these lesions.

Stigmata of the iris. These are principally found in the pupil, and consist of all the possible relics of iritis, *i.e.* permanent deformations of the orifice of the iris of different grade and form, synechiæ of various kinds, pseudo-membranous deposits in the pupillary field, pigmentary alterations, disappearance of the crypts as in tabetics (Antonelli), etc.

Stigmata of the fundus of the eye consists in relics of choro-retinitic alterations with large ophthalmoscopic lesions, and in the rudimentary ophthalmoscopic stigmata of Antonelli.

I. The former are of two principal forms: (a) Atrophic or sclerotic focuses of the choro-retina; (b) Pigmentary choro-retinic deposits, which are easily recognized lesions of sure diagnostic significance.

The first form consists of round or irregular spots one-quarter and one-third,

or more frequently one-half the size of the papillary diameter or even larger, first yellowish (exudative), then whitish, and finally of a white tendinous color (destruction of the choro-retina, white color of the sclerotic membrane).

The second form is characterized by black spots of various number and size, and of rounded, elliptic, or irregular form. The color is a more or less intense black, and often the focus represents a mixture of atrophic spots and of pigment accumulations.

Sometimes a black irregular ring completely surrounds the papilla. Quite often, though, this ring is incomplete, and is formed by one or two uniform sectors (pigmentary ring of the papilla, complete or in sectors, of Antonelli; pigmentary relic of central or peri-papillary choro-retinitis, which evinces characteristics of hereditary syphilis).

II. *Rudimentary ophthalmoscopic stigmata of hereditary syphilis of Antonelli.* Under this name we must list the traces of optic, papillary or retrobulbar neuritis, the signs of retinic vasculitis, of choro-retinitis, or simply the pigmentary dystrophies of the choro-retina, remains of pathologic or dystrophic processes of intra-uterine life or of the first period of infancy.

These lesions of the fundus of the eye, though very often rudimentary, contribute the commonest stigmata of hereditary syphilitic subjects. They are never missing, and we may say that they constitute the best symptoms of hereditary syphilis and confirm the diagnosis in dubious cases. These rudimentary stigmata are essentially as follows:

(1) Dark gray slate-like tint of the fundus of the eye, which is generally found in the circumpapillary region.

(2) Finely granular pigmentation, formed by very minute black spots. The fundus of the eye seems sprinkled with coal-dust. This phenomenon is more or less extended, and generally occupies the equatorial region of the fundus.

(3) Stellate pigmentary spots of the shape of osteoblasts. Like the bone corpuscles, these present numerous fine irradiating prolongations, resembling ten-

tacles or filaments. If numerous and well shaped they constitute the stellate spots of the classic pigmentary retinitis, also located in the equatorial region of the fundus.

The rudimentary stigmata are found to be always or almost always bilateral, and to a certain extent symmetrical, which is one important clinical characteristic of affections of infectious origin, especially of syphilis, as Panas maintains.

What is the diagnostic value of these different ocular lesions? Zimmerman, in a recent study, tends to prove that many parenchymatous keratitis are originated and caused by tuberculosis, either because Koch's bacillus is found in the different organs previously attacked, or because it is found in the eye itself, and sometimes in the corneal infiltration. Other authors go farther and conclude that tuberculosis, scrofula, and all the dyscrasic affections of long duration may in the same manner as syphilis produce not only corneal alterations, but all the toxic disturbances of Hutchinson's triad, and that consequently parenchymatous keratitis ought not to be considered as a sure sign of hereditary syphilis.

Darier is not of this opinion, believing that keratitis is only exceptionally found in subjects affected with tuberculosis and scrofula. He is convinced that whenever dental stigmata are found in combination with parenchymatous keratitis, we invariably deal with hereditary syphilis, whatever the negative data of the family anamnesis may be.

According to Antonelli, interstitial keratitis of syphilitic origin is almost always confirmed by a series of facts of greater or lesser significance. The alterations of the papilla and of the central vessels in the form called by him "central form of hereditary syphilis of the fundus of the eye" are certainly the stigmata which in many instances appear the most characteristic. They must therefore be considered as remains of purely specific lesions, especially on account of the vasculitis.

The pigmentary alterations of the

choro-retinitis would, on the other hand, belong to the dystrophic stigmata.

Albinism of the fundus of the eye, in hereditary syphilitic subjects of dark complexion and with dark hair; the diffuse pigmentation or marble-like appearance, in subjects with lighter complexion and hair; the slate-like tint, the marble-like appearance of the peripheral region, forming what Antonelli calls "premature senility" of the fundus of the eye; finally, the finely granular pigmentation—constitute, like other dystrophies, stigmata of hereditary syphilis.

The rudimentary stigmata which often are the only testimonies of hereditary syphilis are of great diagnostic and therapeutic value. According to the conclusions of Antonelli, the hereditary syphilitic patient, in short, almost always presents serious ocular manifestations, retrobulbar or papillary optic neuritis, retinic vasculitis, neuro-retinitis, choro-retinitis, or similar mixed processes, which evolve toward the end of fetal life or during the first period of extra-uterine life. Such processes of hereditary syphilis of the fundus of the eye are sometimes very slight in attenuated hereditary syphilis, but they always exhibit traces which can be recognized with the ophthalmoscope and which represent rudimentary stigmata doubtless of syphilitic nature.

Functional Disturbances of the Ocular Apparatus.

These stand generally in relationship to the ophthalmoscopic stigmata:

(a) *Longitudinal amblyopia* is often combined with the subatrophic state of the papilla, or with optic retro-ocular neuritis, developed during intra-uterine life or during the first period of infancy, without leaving ophthalmoscopic traces.

(b) *Hemeralopia*, disproportionate diminution of visual sharpness with a diminution of luminous intensity, is combined with the vascular stigmata and with the degenerative and pigmentary alterations of the retina. It is characteristic of the classic pigmentary retinitis.

(c) *Nystagmus*, oscillatory movement

of the eyeball depending upon binocular amblyopia.

(d) *Myopia* is frequently observed in hereditary syphilitic subjects, as Antonelli first brought to notice, and depends upon either a congenital and essential dystrophy of the ocular membranes or upon true specific processes (diffuse choro-retinitis).

Malformations of different kinds are found. According to a classification of Antonelli cited by Fournier, we may have: General anomalies, anophthalmia, microphthalmia, cyclops, colobomatous modality, etc., cranial and orbital anomalies, capable of determining an asymmetry of the orbits and unequal height of the eyes; anomalies of the eyelids of the cornea, the pupil, the crystalline lens, the choroid, etc.

Convergent strabismus. Professor Fournier, in 1898, recorded among the manifest lesions of hereditary syphilis, the frequency of strabismus 21 times in 52 cases of established syphilis. Though unable to explain its mechanism, he believes, owing to its frequency, that it represents a stigma of hereditary syphilis. Almost at the same time Antonelli, in 90 cases of hereditary syphilis found 30 instances of the disturbance of binocular sight, and studied its pathogenic mechanism. He believes strabismus to depend sometimes upon disturbances of the central nervous system, sometimes upon disturbances of the motor portion of the apparatus of binocular vision, and in other cases upon manifest disturbances of the eye itself.

The seat of predilection of the ocular lesions, causing hereditary syphilitic strabismus, is the peripheral apparatus of vision.

PATHOLOGICAL ANATOMY.

What anatomic pathological relations may be established between the ocular, auricular, and dental alterations?

Loktew consistently found histological alterations in the eyes of ten hereditary syphilitic children from seven days to ten months of age. Most of these were cases of vascular lesions (endo-vascu-

litis, perivasculitis, sometimes hyaline degenerations of the vascular walls), parvicellular infiltrations, and granulomatous processes. Generally the alterations affected the uveal region (the iris in every case), and as far as the choroid is concerned, the vascular dilatation, the endo- and perivasculitis, and granulomatous infiltration were observed in the highest part of the posterior or peri-papillary segment.

The optic nerve and its sheaths showed, in at least half of the cases, parvicellular interstitial infiltration and perivasculitis, leading up to granulomatous neoformations in the adventitia of the papillary vessels. The retina also presented endo- and perivasculitis, arteritis obliterans, and lymphoid infiltration.

The vascular alterations found in the majority of more or less tardy manifestations of ocular syphilis are of great importance.

As to the auricular lesions we find:

In otitis media purulens: Inflammation, advancing to suppuration with perforation of the tympanic membrane, alteration of the membrane, destruction of the ossicles, osteo-periostitis of the walls of the tympanic cavity, mastoid abscess, phlogosis of the petrous portion of the temporal, of the sinuses, etc., necrosis of the labyrinth.

In labyrinthitis: Hyperemia, hemorrhages, parvicellular infiltrations, exostosis, alterations of the walls of the bloodvessels (sclerosis, endo-arteritis, which is the commonest), and later connective hypertrophy, atrophy of the functioning epithelium, and sometimes calcareous infiltrations and neoformations of bony tissue.

Even in auricular syphilitic stigmata we note this prevalent character of vascular alterations and parvicellular infiltrations, which can be explained by the characteristics of hereditary syphilis itself, which is a syphilis of sanguine origin. This fact must impress us very much, and since the vascular alterations in dental dystrophies have neither been mentioned nor investigated, we have attempted such research. Our first attempts were unsuccessful, but upon more

closely investigating, with new material, into fully developed dental pulps and pulps of embryonal teeth of hereditary syphilitic subjects, we have reached our aim.

Our preparation, fixed in alcohol and stained with hemotoxylin and orange, gave us the following results. (Oc. 3, ob. 9, Reichert):

The pulp-tissue appears very vascular. The walls of the vessels are thicker than usual, and of a whitish-gray color. The thickening is due to a superabundance of small cellular roundish elements which look like embryonal cells and which are found especially in the superficial layers, diminishing in number in the deeper layers, and to a few other cells, larger, flat, with several prolongations, containing either one or two nuclei, which are simply enlarged normal connective tissue cells of the intima.

The tunica media is not affected. Even on the adventitia, which appears more homogeneous and gelatinous, a slight thickening is noticed due to the presence of young and small cells among the connective fibrous tissue. In some preparations numerous red blood corpuscles are seen outside of the walls of the vessels, also parvicellular infiltration, which without a distinct line of demarcation from the surrounding tissue extends on the vessel walls.

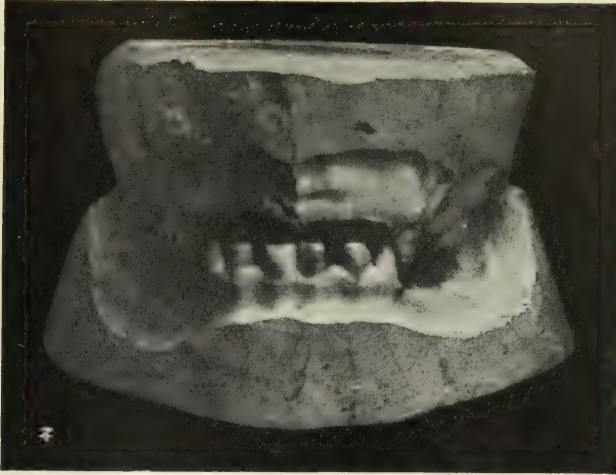
As in the ocular and auricular stigmata of Hutchinson's triad, we also find in dental dystrophies: *Endovasculitis, perivasculitis, hemorrhagic and parvicellular infiltration*. No one can help but appreciate the importance of such alterations, which speak so well in favor of our argument, and represent a valid proof in confirming the syphilitic theory.

These three kinds of stigmata bear the following additional relationship to each other: The ocular stigmata appear during the first months of extra-uterine life, and generally represent the vanguard of the other two specific manifestations. The auricular stigmata appear either during the first period of life (otitis media) or at the age of from eight to twenty years (labyrinthitis). The dental stigmata can be found from the sixth

to the thirty-eighth month (first dentition), or from the sixth year onward (second dentition). These dental stigmata are the most persistent and the

characteristics common to these three lesions we may note: *The arrest of development and the malformations of the respective organs, the generally present*

FIG. 7.



Partial congenital absence of some teeth.

FIG. 8.



Hutchinson's teeth. Sulciform erosions on lower incisors; honeycomb erosions on first molars.

most incurable; they last during the individual's lifetime and are still found after death. Moreover, they are the most manifest, and enable us to diagnose hereditary syphilis at first sight. As

symmetry, and the bilateral character of the lesions.

The relations between the ocular and dental stigmata are much more numerous

and frequent than the simple conception of the classic Hutchinson's triad would lead us to believe. As a matter of fact, according to Antonelli, the most constant

We must look for them in the whole dental system, in different form, arrangement, alterations, and even in the absence of some of the dental units. As

FIG. 9.



Microdontism. Honeycomb erosions.

ocular lesions are generally found in the anterior uveal portion, in the choro-retina or in the optic nerve, in the state of permanent suppurative lesions, rather

to the auricular stigmata, their value is diminished by the situation and structure of the organ—inaccessible to our means of exploration, and, hence, in-

FIG. 10.



Dental polymorphism.

than in the cornea in the form of interstitial keratitis or a state of terminated evolution (remains of opacity and vascularization). The dental stigmata, also, as we have seen, are far from being restricted to Hutchinson's symptoms.

capable of showing us analogous rudimentary stigmata, except functional disturbances or the large lesions of otitis. Such auricular stigmata are certainly the least frequent among the three kinds with which we are concerned.

CASE I.

Leontina Chev. (eight years of age). The patient was taken to Antonelli's clinic in February 1898, together with a sister who presented developing bilateral parenchymatous keratitis, and with a brother exhibiting only ophthalmoscopic lesions.

Ocular lesions: Acute dacryocystitis on the right, on account of secondary infection, and naso-lacrymal osteo-periostitis. (The nose is flattened at the base; chronic rhinitis; regular form of bull-dog nose. At the free margin there are very prominent tubercles.) Congenital or at least infantile myopia, of 5 diopters on the left and of 7 on the right (anisometropic hereditary syphilitic myopia, first reported by Antonelli). Ophthalmoscope—O. S. shows remains of papillitis, O. D. analogous remains of papillitis, no atrophic foci of the membranes, but pigmentary marble-like and very irregular marks and finely granular pigmentary spots.

Dental lesions (Fig. 7): Partial congenital absence of some teeth (upper incisors and two lower deciduous molars). Abnormal arrangement of the lower incisors (gap between the lateral and central on each side). This absence of teeth contributes to give the child the appearance of an old woman (premature senility).

CASE II.

Giorgina Blanch. (eleven years of age). The patient was presented at Antonelli's clinic in November 1907, affected with recurrent iritis of the right eye. At five years of age had a serious prolonged ocular affection, probably parenchymatous keratitis according to the particulars given by the mother, which was cured without leaving traces; the corneæ are quite transparent without vascular residues. The ophthalmoscopic examinations show simple rudimentary stigmata, evident pigmentary dystrophy, especially about the periphery of the fundus of the eye in the lower portion.

Dental lesions (Fig. 8): The upper central incisors show the typical Hutchinson's edge. Honeycombed erosions are present on the first molars, also very well marked sulciform erosions of the free edge of the lower incisors.

CASE III.

Andreina Blanch. (fifteen years of age), a sister of the preceding patient, called at Antonelli's clinic on October 3, 1907.

Ocular lesions: The left eye is slightly hypermetropic. It presents normal visual

acuity, and upon ophthalmoscopic examination shows simple diffuse pigmentary dystrophy of the choro-retina. The right eye is myopic, 6 diopters, and notwithstanding a correcting lens has only two-tenths of visual acuity. The ophthalmoscope shows a grayish white papilla, without manifest alterations of the vessels and the margins. As in the left eye, diffuse pigmentary dystrophy is present. To sum up, there is monocular congenital myopia, partial atrophy of the papilla of the corresponding eye, due to probable optic retro-ocular neuritis, and diffuse pigmentary dystrophy of the choro-retina in both eyes.

Dental lesions (Fig. 9): Microdontism is present and is especially evident in the central upper and lower incisors, in the upper canine, and in the first molars (contemporaneity of this lesion).

Honeycombed erosions are not only evident in the upper and lower molars, but also in the upper central canines and incisors.

CASE IV.

Paolo Hen. (thirty-two years of age) presented himself at the dental school and was sent to Antonelli's clinic by Professor Bonnard, January 18, 1907.

Ocular lesions: The right eye shows a deformed polygonal pupil, which, however, reacts normally to slight stimulus (absence of posterior synechiæ) and in moderate light becomes more regular, almost round (median dilatation), showing a pronounced difference from the state of reflex myosis. On the anterior crystalloid, in the center of its pupillary field, by the aid of focal illumination and the magnifying lens, are seen very fine pigmentary deposits. Under the ophthalmoscope are observed paleness of the optic papilla and choro-retina with pigmentary dystrophy especially marked near the periphery of the fundus of the eye.

The right eye presents large iridic supranasal coloboma, due to iridectomy performed at the Hôtel Dieu thirteen years before for post-traumatic lesions. Large leucoma on the inferior zone of the cornea, with an adherence of the periphery of the iris (traumatic lesion). Pigmentary and previous exudatory deposits are found on the crystalline lens (pseudo-cataract of iritic origin). Notwithstanding these alterations, the fundus of the eye is perfectly visible under the ophthalmoscope, especially through the artificial coloboma. The optic papilla can be distinguished, but with an indistinct and irregular margin and surrounded by numerous small foci of peri-papillary choro-retinitis, some atrophic, others overloaded with pigment, so as to form

segments of a pigmentary circle around the optic disk. Diffuse pigmentary dystrophy is present as in the left eye. To sum up, leaving aside the traumatic lesions of the right eye, we have: Pupillary malformations in the left eye (dyscoria and remains of the pupillary membrane, probably due to a pathological uveal process during intra-uterine life); rudimentary ophthalmoscopic stigmata in both eyes, represented by pronounced and diffuse pigmentary dystrophy of the choro-retina, by the appearance of the optic papilla, and especially by the crown of foci of peripapillary choro-retinitis in the right eye.

Dental lesions (Fig. 10): Dental polymorphism. In the maxilla the central incisors are thick, amorphous, almost globular; the laterals present the shape of cones. The first left molar is dwarfed (microdontism). Moreover, there is an anomaly in the position of the right lateral incisor, which has taken the place of the canine and *vice versa* (follicular emigration, which is a very rare anomaly).

In the mandible we notice an anomaly in the arrangement of the anterior third, especially on the right side, besides an atresia of the anterior third of the jaw itself.

DIAGNOSTIC VALUE.

To establish the diagnostic value of a symptom it is necessary to find out:

First: If such a symptom belongs exclusively or not to the disease in which it is noticed. In the affirmative case it constitutes a pathognomonic sign of the disease; in the negative case its value is relative.

Secondly: The degree of importance of such a diagnostic factor must be established, which is proportionate to the rarity of the symptom in other diseases and to its frequency in one particular disease.

In our study these questions arise: Are the dental dystrophies to be attributed to hereditary syphilis exclusively? And, if so, are they of syphilitic nature or origin? Does a tooth pathognomonic of syphilis exist?

Writers have answered these questions in different ways according to the different theories held, as follows:

The followers of the absolutist syphilitic theory, headed by Hutchinson, attributed the cause of the dental lesions to hereditary syphilis exclusively. Sev-

eral writers have raised numerous objections, claiming that such lesions are disturbances of nutrition, depending upon a common dystrophic process which any morbid general affection may produce.

Others consider as a cause of dental alterations serious diseases and pyrexiae during infancy (Fauchard, Bunon, Mahon, Fournier, Broca); others, tuberculous scrofula (Castanié), rhachitis (Parrot, Nicati), eclampsia and infantile convulsions (Magitot, Rattier, Leplat), hereditary degeneracy (Galippe), intoxication (Capdepont). Many of these conjectures are entirely untenable. In fact, very often we find that the diseases and pyrexiae of infancy do not coincide with the time of the formation of the erosions or with their topography. We have already mentioned the reasons which upset the eclamptic theory; when the eclampsia appears the dental atrophy is already established.

As to rhachitis, we have spoken of the modern tendency to regard hereditary syphilis as its etiological cause. At any rate, we can always observe that the period of activity of rhachitis does not coincide with the time of the intra-alveolar formation of the affected tooth, but follows it, and that congenital rhachitis is exceptional, as the first symptoms of this disease appear at about the first year.

Hollopeau and E. Fournier, after investigating into the dental dystrophies presented by a large number of children affected with different diseases in the principal hospitals of Paris, have come to the conclusion that dental erosions are very rare in tuberculous or rhachitic subjects, who make up the great majority of the inmates.

The same authors, criticizing Galippe's theory of dental alterations transmitted by mere heredity (which is subject to discussion) affirm that they have not been able to find any data favoring this theory, and that even if it had been corroborated by a certain number of cases, the action of syphilis would still remain a very important factor.

Mlle. Alice Sollier, in her studies on the dentition of idiots and backward

children, has found the following alterations: (1) Prematurity of the first dentition, eight times in 60 cases. (2) Retardation of the first dentition, in 25 per cent. of cases. (3) Premature loss of the first dentition, once in 100 cases. (4) Retardation of the second dentition, in 36 per cent. of cases. (5) Microdontism, in 14 per cent. (6) Megalodontism, in 11 per cent. (7) Other malformations, in 53 per cent. (8) Longitudinal grooves, in 41 per cent. (9) Jaggedness, in 58 per cent. (10) Erosions (more frequent without than with convulsions), in 5 per cent.

In idiotic, epileptic, and hysteric subjects, ogival palate and prognathism of both jaws are also found.

On superficial examination the dental alterations in idiots and in hereditary syphilitic subjects look very much alike, but although presenting some points of similarity they are different in numerous respects. Each kind has its own peculiar type, as E. Fournier says, and with a little practice and experience one can, upon examining the dentition of a child, unmistakably diagnose whether it belongs to an idiot, to a backward child, or to an hereditary syphilitic subject. We have been able to observe about fifty children of both sexes in an asylum for backward children, and we can assert that we have not found even a single case of Hutchinson's teeth, or systematic or symmetric cuspal atrophies of the permanent canines and first molars. We have found one single case of pitted erosion in the incisors, five cases of cup-shaped erosion in the first molars, but not symmetrical, and one indication of cuspal atrophy confined to a single canine, while the other canines, the molars, and the incisors were perfectly normal. In one boy we found central caries in the first permanent molars, which were normal in size, shape, and arrangement, but no sign of cuspal atrophy. The lesions found in backward children very frequently consist in vertical grooves parallel to the axis of the tooth, in jaggedness of the free edges of the upper and lower incisors—which is not, however, deep, and presents no altera-

tion of color (observed in fourteen cases). Megalodontism (found in six cases) is fairly frequent, microdontism less so. Both dentitions are generally retarded, and the persistence of the deciduous teeth is rather common.

As to maxillary dystrophies, we have noticed one single case of ogival palate, three cases of superior prognathism, and six cases of malocclusion.

From these observations we arrive at the following conclusions:

(1) True dental erosions are extremely rare in idiots; in hereditary syphilitic subjects they constitute the predominating characteristic of the dystrophies.

(2) Hutchinson's teeth, and systematic cuspal atrophies of the canines and the first molars, are not found in idiots; they are, however, very frequent in hereditary syphilitic subjects.

(3) The vertical grooves and the jaggedness of the free edge are very common in idiots, especially in the incisors, yet are rare in hereditary syphilitic persons.

(4) Megalodontism is frequent in idiots; but is exceptional in hereditary syphilitic subjects.

Even in regard to anomalies of the dental arches (prognathism, irregularity of articulation, semilunar hollowness of the arches, asymmetry and difference in level of the two halves of the upper arch) marked differences are found between the two types. These anomalies are far more frequent in idiots and are much more marked.

Various objections have been raised against the syphilitic theory from the fact that dental erosions have been found in animals.

Magitot in a nine-year-old ox has seen the two centrals affected with symmetrical erosions. These erosions were transversal and deep, and occupied the upper third of the crown. On histological examination a zone of globular dentin corresponding to the level of the erosion was found. Capitan presented to the Society of Anthropology a maxilla of a dog, affected with multiple dental erosions. According to Trasbot dental erosions are frequently found in dogs,

especially in the incisors and canines, in connection with a disease called "dog's disease." Durval has seen a collection of teeth affected by erosion, among which were teeth of a horse, an elephant, and a hippopotamus.

These objections, which the opponents of the syphilitic theory have until lately used as a powerful weapon, have now lost most of their significance. The syphilitic virus has been inoculated with positive results in several animals, which were believed to be immune from syphilis. As a matter of fact, Bertarelli, in a communication reports having succeeded in the positive inoculation of the dog and the sheep. The virus used in these inoculations had been secured from a seventh passage made through the cornea of the rabbit. The virus was introduced into the anterior chamber, and the characteristic specific keratitis appeared ten days after the inoculation. In the dog the lesion presented more marked characteristics than in the sheep. The syphilitic nature of these lesions has been confirmed by microscopical examination and by successive re-inoculations in rabbits, which yielded positive results.

As to syphilis in the pig, we believe that new researches are necessary before we can come to any conclusion.

Hoffman and Bruning also have succeeded in inoculating the syphilitic virus in the dog, as well as in the rabbit and the monkey. Two dogs were inoculated in the anterior chamber of the eye with fragments of human syphiloma, and both, after a period of incubation varying from sixteen to twenty-one days, presented a specific keratitis with spirochæta, with all the characteristics observed in inoculated rabbits and monkeys. These authors remark that syphilitic keratitis is obtained in the monkey, not only by introducing the virus into the anterior chamber, but also by simply scarifying the cornea. This, contrary to Neisser's opinion, proves that to obtain good results from the inoculation it is not necessary to expose the bloodvessels.

The number of species of animals

which have been proved to be susceptible to syphilitic contagion is considerably increasing, *e.g.* the hare, the higher and the lower simians, the dog, and the sheep. Additional experiments and observations are bound to yield further results in the same direction.

The other objection raised against the syphilitic theory is based upon the fact that in an old Gallo-Roman cemetery at Brény (Aisne), the maxilla of a young Frank of the Merovingian epoch was found with double sulciform erosions in the incisors and simple ones in the canines and first molars. Did syphilis, then, exist at the time of the Merovingians?

The question of the origin of syphilis has been treated by many authors, but its solution is a difficult matter. From historical investigations, from examinations of old writings, we cannot find anything that positively proves the existence of syphilis in ancient times. Even in a recent essay Notthafft concludes that the beginning of syphilis in Europe dates from 1495, and is connected with the discovery of America. It is therefore not very easy to explain the existence of dental erosion at the time of the Merovingians; but one single case neither upsets the rule nor overthrows observations and experiences. In time, however, the Merovingian erosion may be explained like that in the dog, the ox, and the horse.

If we are to answer the question, whether dental dystrophies are, then, to be attributed to hereditary syphilis exclusively: although we assign the first place in importance in their formation to hereditary syphilis, which is almost the only disease that acts on the fetus during intra-uterine life or during the first months after birth, we cannot attribute to it exclusively *all* dental dystrophies. There are, indeed, a number of lesions in common which may not be exclusively attributed to syphilis; to these, however, can be attributed but little value. In a general way we may say that the dental anomalies depending upon trophic disturbances may be produced by any morbid cause which acts

upon and disturbs the dental follicle during its development.

But—what can be this morbid cause? Will the topography of the lesion correspond with the time at which the disease appeared? May several morbid agents independently determine the same lesion?

Several diseases have been suggested in explanation of the cause of erosion, but little has been done toward studying the relations between the causal disease and the erosion thereby produced. It has not been verified whether the lesion imprinted on a tooth has been produced exactly at the time indicated by the lesion itself. Isolated common erosions, as found here and there in some teeth, may certainly be due to an accident or to some local disturbance. But the symmetrical, systematic erosions, which are located always on the same kind of teeth, always on the same level on teeth of the same type and on a different level in other types—to what morbid cause could they be attributed if not to syphilis? Which other disease could produce Hutchinson's teeth, the cuspal erosions of the first molars, the multiple systematic erosions? Professor Fournier maintains that, of 100 cases of dental erosions, 80 are to be attributed to hereditary syphilis, and only 20 to other causes—which, too, may be *unknown or old syphilitic heredity*.

The very nature of syphilis explains the frequency with which it causes dental alterations. Being an essentially dystrophic disease it affects the nutrition and the development of all the organs and systems of the body; therefore it is not surprising that it very frequently also exerts its destructive influence on the dental system. Another fact which supports our thesis is the time of the formation of the dental lesion. The erosions are found in the incisors, the canines, and the molars, in exceptional cases also in the bicusps, and they are found at the time of calcification of these teeth during intra-uterine life or during the first months of extra-uterine life, owing to a disturbance in the above-named process. Syphilis is *the* disease

which is found in vigorous action during that period of life, and it is to such a disease that principally if not exclusively all dental lesions are to be attributed.

What Significance May We Attribute to the Dental Stigmata?

Are they syphilitic stigmata in the true meaning of the word, or are they dystrophic stigmata? In other words, are they of syphilitic nature, or simply of indirect syphilitic origin? Until a short time ago this question seemed hard to answer; at the present time, however, it appears much easier. Let us examine the subject.

(1) Pathological anatomy teaches us that the tissues react to the syphilitic virus by a double process of leucocyte infiltration and connective-tissue hyperplasia. In our anatomico-pathological researches on the dental pulps of syphilitic fetuses we have found vascular alterations, hemorrhage, and parvicellular infiltration. Moreover, the discovery of the spirochæta pallida in the dental tissues leads us to believe that the dental stigmata are not merely simple dystrophies, but lesions of syphilitic nature. Other facts that must not be neglected and which contribute to prove our statement are the delay in development of the teeth, the alteration of the dental tissues, the congenital absence of dental germs, the anomalies of structure, direction, shape, size, etc.

(2) It sometimes occurs that a subject with dental stigmata born of syphilitic parents is free from every specific manifestation; several such cases have been recorded. We must not always expect to find in a syphilitic subject the characteristic decrepitude, wrinkled, and dry facies of a small, aged man, with a hoarse voice, a blade-like tibia, polymorphous alterations of the skin, the mucosæ, and the bone, with infantile forms, etc. We may sometimes find a well-formed and well-developed subject with only the dental alterations, who may never have had either premature or tardy manifestations of hereditary syphilis.

(3) Cases have been observed in which subjects with dental or ocular stigmata of hereditary syphilis (Antonelli) presented recently acquired syphilis. The re-infection of hereditary syphilitic subjects is less frequent than was believed (*cf.* the recent thesis of Rostaine). As we cannot suppose a reiteration of the infection, only some very rare cases having been recorded, we must believe that the hereditary syphilitic subject, at the time of the contagion, although affected with hereditary syphilis as evinced by dental and ocular stigmata, etc., was nevertheless perfectly free from every *active*, so to speak, syphilitic lesion. Professor Fournier cites an observation of an hereditary syphilitic subject with Hutchinson's teeth, who contracted syphilis, and a similar case is reported by Dr. Fournier; both of these authors come to the conclusion that the dystrophic stigmata do not imply active syphilis in the subject which bears them.

(4) The recent researches of Neisser on experimental syphilis in monkeys open a large field for inductions. Neisser has established the fact that monkeys have been able to contract the syphilitic infection two or three times. Could it not be possible that the hereditary syphilitic subject at the time of the new, the personal infection, is already cured of every known or unnoticed syphilitic lesion he may have had, either through successful curative treatment or through the reaction of the tissues? This hypothesis may seem rather daring, but in the near future several obscure points will probably be elucidated, as our knowledge of the biology of the spirochæta becomes more complete. Let us therefore wait until the last word has been pronounced on these problems of such a complex nature.

(5) It frequently happens that the dystrophic lesions are associated with true syphilitic lesions, as we have noticed in our own cases, and that a subject with such dental lesions may be syphilitic at the same time.

(6) It must be noted that often the manifestations of congenital syphilis are fleeting, and may therefore be unnoticed, and that, besides, the tardy manifesta-

tions may not yet be evident at the time when the subject presenting the dental stigmata is examined. In such a case we are unable to say whether the patient has been or is still affected with purely syphilitic manifestations.

(7) We must not forget, however, that hereditary syphilis is a disease which essentially manifests itself through stigmata; that it possesses "dystrophic character" quite differently from tuberculosis, alcoholism, idiocy, etc., and that it manifests itself in an entirely peculiar manner. If it manifests itself by a general action on the whole organism we shall find arrest of development in all the organs and tissues. In such a case the hereditary syphilitic stigmata superabound, and together with the dental stigmata we may find ocular and auricular stigmata, cranial malformations, arrest of development, multiple stigmata of infantilism, etc.; if its action is a little less intense we naturally find a smaller number of stigmata.

If it exercises only a partial, local influence on a single apparatus or system, or on a part of a system, we observe partial, single, old, or rudimentary stigmata. Such a partial, local action is often exercised on the dental system or on a part of it, so that in hereditary syphilitic subjects we sometimes find only the teeth or only a few teeth affected.

These dental lesions are, however, characteristic and peculiar, in that they cannot be mistaken for lesions due to any other disease. In the infrequent cases, therefore, in which they are found alone, the dental stigmata sufficiently indicate hereditary syphilis, and we must consequently consider them as pathognomonic of that condition.

Does a Pathognomonic Tooth of Syphilis Exist?

It is a well-known fact that in connection with syphilis all the dental erosions already described may be found; but not all can be called pathognomonic of hereditary syphilis.

According to the French school, especially Fournier, the dental stigmata

pathognomonic of hereditary syphilis, are the following: (1) Hutchinson's tooth. (2) Cuspal erosion of the first permanent molar. (3) Multiple and systematic dystrophies of the permanent teeth.

We add to these: (4) The multiple and symmetrical dystrophies of the deciduous teeth.

(1) *Hutchinson's tooth.* The tooth with the crescentic notch was first believed by Hutchinson to be an absolute and pathognomonic sign of hereditary syphilis.

No other lesion resembles Hutchinson's tooth. The artificial dental malformations which can simulate the alterations of hereditary syphilis on the central incisors are infrequent. We note among them the erosions due to the use of the pipe, the professional deformations described by Morel Lavallée in shoemakers, produced by the habit of holding in the mouth the tacks used for fixing the soles. Such deformations consist in a wearing-out of the enamel on the free edge of the tooth, almost in a crescentic form.

Fournier and Hallopeau maintain that they have never noticed Hutchinson's tooth except in hereditary syphilitic subjects. We have seen that the upper incisors calcify during the earliest months after birth. Just at that time eruptive fevers are rare, and any other serious disease capable of producing alterations of the dental follicle may very easily cause the death of the child. Only hereditary syphilis, if it be not serious enough to produce abortion or the death of the newborn (the mortality among hereditary syphilitic children is 68 per cent. according to Fournier) is capable of manifesting its noxious influence in a general way on the whole organism, and particularly on the dental system, and of producing Hutchinson's tooth.

A few authors deny this absolute value of Hutchinson's tooth, and affirm that the erosion has been found in subjects born of healthy parents and free from any syphilitic influence. Apart from such cases being isolated and very rare indeed, could it be proved that they are

really authentic and assuredly found in individuals not only free from hereditary syphilis but also from inherited hereditary syphilis, surely the great frequency and the exclusiveness with which the semilunar erosion has been found in hereditary syphilis (eleven times in 37 cases, according to our observations) authorize us to conclude that the typical lesion of Hutchinson is to be considered as a pathognomonic sign of hereditary syphilis.

(2) *Cuspal atrophy of the first permanent molar.* The first permanent molar is the only permanent tooth which begins to calcify during intra-uterine life, during about the sixth month. Atrophy of its occlusal surface has therefore a clear and precise significance. The tooth during its cuspal development has experienced the inhibitory action of a general morbid cause which has arrested the development, and this general morbid cause acting at that time of fetal life can only be syphilis. The cuspal atrophy of the first molars is very characteristic and constant, but disappears rather early. While the other lesions are generally not found alone, this one often is the only indication of the syphilitic infection. In our observations we have noticed this fact, which has been found in no other disease. Together with Fournier, Hallopeau, and Darier, we consider it pathognomonic of hereditary syphilis in the same way as Hutchinson's tooth.

(3) *Multiple systematic cuspal dystrophies of the permanent teeth.* As we have seen, the cuspal atrophy of the first permanent molar may alone indicate hereditary syphilis, and in such a case the causal disease has ceased to act after the evolution of that tooth. This lesion can be almost always found together with Hutchinson's tooth, indicating that the causal disease has ceased to act during about the second month after birth. But together with the above lesions we may find cuspal atrophy of the canines (the causal disease has in this case ceased from the fourth month after birth), and sometimes even erosions on the bicuspid, if the morbid cause has not ceased to act

until after the sixth month after birth. As with the lesions of the first permanent molars and of the incisors, cuspal atrophy of the canine is of great diagnostic significance, and we can attribute to it almost the same value, since this tooth also falls under the inhibitory influence of syphilis, which, as we know, manifests itself during the last months of intra-uterine life and the first months after birth. But when such a lesion is found it is always or almost always accompanied by an arrest of development of the molar and the incisor. As to cuspal atrophy of the canine, we find it to be the same as that in the incisor and the first molar which have previously felt the action of the syphilitic heredity. If the lesions of the incisors and of the first molar are to be considered separately as pathognomonic, the lesions of the incisor, molar, and canine together are to be regarded as all the surer signs of hereditary syphilis. These multiple alterations—which are always found on the same kind of teeth, *i.e.* the incisors, canines, and first molars (sometimes the premolars), and never on the second and third molars—which are found at the same level in corresponding teeth and at a different level on teeth of a different type—these symmetrical, systematic alterations that are with only few exceptions subject to so strict a law, must surely depend upon a general pathological process, serious and of long duration, which produces an arrest of development of the dental follicle during intra-uterine life (sixth month), producing the atrophy of the first molar, or during extra-uterine life (first month) producing Hutchinson's tooth and the atrophy of the canine. The same is true of the coronal erosions.

The different lesions only represent the chronological moment of the beginning influence of the morbid cause, which always remains the same. If the molars are developing at the time of the specific action they will show traces of this disturbance; if the incisors are developing at that time we shall have Hutchinson's teeth; if the canines, we shall find on them the dental stigmata. These lesions

are exclusively due to hereditary syphilis, and we must assign to them an absolute pathognomonic value in the diagnosis of this disease.

(4) *Multiple dystrophies of the deciduous teeth.* The deciduous teeth have been unjustly neglected by almost all authors. Few have devoted proper attention to the lesions which they present. These teeth, being very fragile, subject to caries, especially if eroded, and of brief existence, easily escape notice. They therefore need a vindication, as they also possess characteristics and a value of their own. They also often present the crescentic notch of Hutchinson in the incisors, the sulciform erosion in the canines, and the honeycombed erosion in the molars. These multiple erosions, similar to those of the permanent teeth, are also symmetrical and systematic. The honeycombed erosion is almost always found in the cases in which the deciduous molars, especially the second, persist in the permanent dentition, and this lesion is therefore still noticeable in adults. Why should these lesions which precede by several years the lesions of the permanent incisor, molar, and canine, and which are often observed before the ocular lesions and enable us to diagnose hereditary syphilis so long beforehand, be neglected? Do they not rather call for the same attention as the lesions of the permanent teeth?

The deciduous teeth develop a few months before the first molars. If the latter present the notch characteristic of the syphilitic infection, why should not the deciduous teeth sometimes present the same lesion? We know that syphilis generally begins its ravaging action during the second half of pregnancy, and that the deciduous teeth develop during the first half. But how many times is there a retardation of this process, and how many times does it happen that syphilis anticipates its effects a little! Admitting one and the same cause in the formation of the alterations of the permanent and the deciduous teeth, we must assign pathognomonic value to the lesions of the deciduous teeth; this is of great importance, as it allows us to diag-

nose hereditary syphilis at a very early stage, before the appearance of any other stigmata. Capdepont, Tronchon, and Oberwarth are of the same opinion. The latter has studied 27 children with Hutchinson's teeth, of which 24 were unmistakably and 3 probably affected with hereditary syphilis; and according to him this dental alteration is one of the most authentic and important symptoms of hereditary syphilis.

Maxillary and mandibular dystrophies. Can we assign a pathognomonic value to these dystrophies? Though syphilis is capable of producing all the alterations and deformations of the jaws already described, nevertheless none of these lesions can be said to be pathognomonic of hereditary syphilis unless they are accompanied by other characteristic stigmata. As a matter of fact the etiology of the ogival palate is not well defined yet; malocclusions, and superior and inferior prognathism resulting from them, may be due to several other causes; cleft palate is not caused by hereditary syphilis exclusively; so that at the present time we may say that syphilis plays a great although not exclusive part in the formation of maxillary and mandibular dystrophies.

THERAPEUTIC CONSIDERATIONS.

What is the curative plan to be followed in cases of maxillary and mandibular dental stigmata? Upon consideration of the different lesions of the jaws and teeth as depending upon a general morbid cause which exerts its influence on the whole organism, two curative methods are suggested, the one of a general and the other of a local nature, both of which we shall outline. We have seen that dental lesions are rarely found alone; ordinarily they are accompanied either by other dystrophies or by syphilitic manifestations. Three cases are to be considered:

(1) If dental lesions are accompanied by present syphilitic lesions, it is obvious that the specific curative treatment is indicated and is of absolute necessity.

(2) If the dental stigmata are found together with other hereditary syphilitic stigmata, the specific treatment is indicated for the sake of prevention, because the plurality of the stigmata indicates that the intensity of the infection transmitted to the subject is considerable, and the appearance of some syphilitic lesion may be expected, even if the patient has been apparently immune up to the time of the treatment.

(3) If the dental lesions are found absolutely alone, and the patient has not yet shown any syphilitic manifestations, the specific treatment is indicated for the sake of prevention, especially if he be a child. If we are dealing with an adult of between twenty or twenty-five years of age, well formed, well developed, and in a perfect state of health, we may, to be sure, wait for some abnormal manifestations before starting a cure. But if we have a case of a nursing child or of any child whose organs and whose whole system may be disturbed in their development by the syphilitic influence, the specific treatment is clearly indicated without waiting at all; because, even if we wait, and may consider the dental stigmata as only para-syphilitic, "who knows," as Professor Fournier says, "where syphilis ends and para-syphilis begins? To begin with, I being the discoverer of para-syphilis, would be very much embarrassed to assign the proper boundaries to each;" and he concludes that "The diagnosis of dystrophic stigmata in a child affected with hereditary syphilis, or only suspected of it, is a formal indication for the specific treatment even in the absence of either antecedent or present specific manifestations."

What influence does the general specific treatment have on the dental dystrophies?

If the cure is to begin at a time when the teeth of the second dentition have already developed, and the dental stigmata have already appeared, the latter evidently cannot be influenced by therapeutic means. But if the treatment be started at a time when the teeth of the second dentition are not entirely calci-

fied, and if it be impossible to prevent the formation of the alteration which has already occurred in fetal life or during the first months of extra-uterine life, we may by the analogy of what happens in other dystrophies suppose—although not yet prove—an attenuation in the diminished resistance of the tissues, as manifested by the friability of the teeth and their predisposition to caries.

Locally, the cure varies according to the different lesions. In erosions of the crown the treatment is almost *nil*, as the lesion, which is already definite, cannot be modified. Treatment is confined to cauterizing the dentin in cases of sensitiveness, and to grinding away the roughness which might annoy the mucosa of the mouth or the tongue.

In cuspal erosions of the incisors, canines, and first molars the same method of treatment is to be followed. If after the loss of the atrophic portion caries has set in on the sound part of the tooth, it has to be treated like ordinary caries and the tooth must be filled. The tooth is only to be sacrificed if, for the sake of appearance, it is advisable to cut down the crown and to supply the root with an artificial crown. The cuspal erosion of the first molar is very frequently accompanied or followed by premature or tardy caries.

If the course of the caries be chronic, the curative treatment often yields a favorable result, but if the caries be acute, as often happens, any cure is useless, because the process of destruction is a very rapid one. The small atrophic stubs, which owing to the wearing away seem enchased on the top of the body of the tooth, not being capable of withstanding the shocks of mastication, the tooth-body, already reduced, is quickly attacked by caries, which progresses very rapidly, inasmuch as the dental tissues, being improperly calcified and very friable, offer little resistance. The tooth is thus in a short time reduced to a small stub, and is destroyed almost to the gingival border, the walls being

very thin and apt to break at the slightest shock. In such a case every attempt at saving the crown is useless, for with our antiseptics and our ordinary means of filling we cannot stop the destructive action of the micro-organism of caries in greatly altered tissues with large dentinal tubules, which permit of an easy access to the infection. The tooth is irredeemably lost—and from clinical observations we know how frequently the first molar in adults is lost in consequence of premature caries with complete destruction of the dental tissues. The preservation of the roots is advisable, as they may support an artificial tooth, thereby preserving the integrity and harmony of the dental arches, unless they might prevent the second molar from erupting, which sometimes happens owing to the defective development of the jaws and consequent narrowness of the dental arches. In such a case it is better to extract the roots to make room for the second molar, and later on for the third molar, which, as we know, is often the cause of serious complications, owing to lack of space, which is limited anteriorly by the distal surface of the second molar and posteriorly by the anterior border of the coronoid apophysis.

The deciduous teeth which persist in the permanent set and occupy the place of the permanent ones should not be extracted, but religiously preserved, as frequently they are never replaced.

Malocclusion, bad articulation, and ogival palate are to be corrected according to the rules and principles of orthodontia.

For perforations of the palate, various obturators are on the market.

Hare-lip requires surgical treatment after the well-known methods of Mirault, Giralès, etc., and cleft palate must be treated by urano-staphylorrhaphy and prosthesis, if the surgical treatment has proved of little avail or if the fissures are too extensive, as is especially the case in bilateral cleft.

(To be continued.)

ANATOMICAL ARTICULATION.

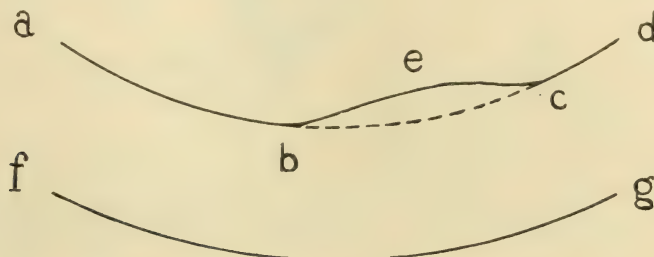
By H. DE WITT CROSS, D.M.D., Boston, Mass.

(Clinic at the twelfth annual meeting of the National Dental Association, Boston, Mass., July 28, 1908.)

THE characteristics and essentials of anatomical articulation are merely copies of a normal set of natural teeth, not anything which man has invented; he has only applied nature's principles. These principles apply with equal advantage to the shaping of oc-

The compensating curve. The compensating curve (Fig. 1) is double, and is made up of a fundamental and a secondary curve. The fundamental curve compensates for the direct forward or protruding bite, while the secondary curve compensates for the cornerwise or

FIG. 1.



a b c d, Fundamental compensating curve. b e c, Secondary curve. a b e c d, True compensating curve. f g, Curve of lower teeth.

clusal surfaces of fillings, to the position of teeth which have been regulated, to crowns and bridges, and to removable dentures, in regard to their articulating or antagonizing bite.

Assuming a correct bite, three things are necessary in order that teeth may be arranged to antagonize correctly: (1) An articulator capable of reproducing the movements of the mandible, and susceptible to the necessary adjustment for individual cases—the anatomical articulator. (2) A means of obtaining the correct relation of the models to the condyle of the articulator—the face-bow. (3) A method of adjusting the angle of the condyle path on the articulator to correspond to the individual angles of the path—the protruding bite. (Fig. 4.)

condyle-to-canine movements of the mandible, the chief movement of mastication. The condyle path and the fundamental curve are arcs from a common center, but not necessarily of the same radius. It is because of this center that the curve compensates for the downward motion of the condyle, teeth and condyle rolling together about the common center. The secondary curve embraces the lateral, canine, and bicuspid. On account of the overbite the secondary curve is less marked in the lower teeth.

The compensating curve is in direct relation to the angle of the condyle path, *i.e.* a greater angle means a greater compensating curve, and *vice versa*.

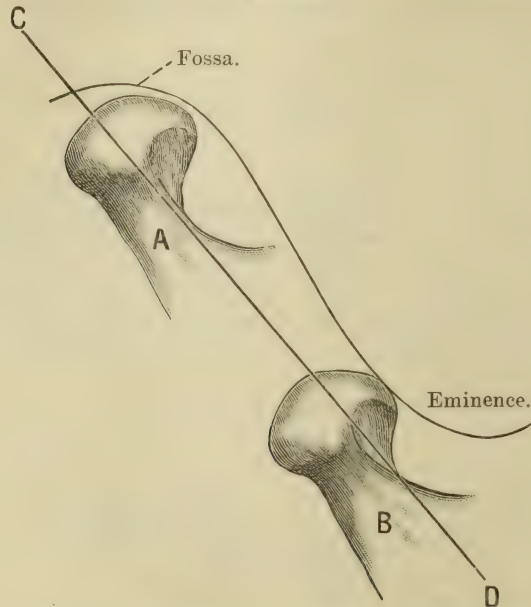
The length of the cusps of the bicuspid and molars stands in direct rela-

tion to the overbite or cusp of the incisors. (See Fig. 9, on page 38.)

The condyle path. The condyle path (Fig. 2, c and d) is the line of motion

may be considered a straight line, as it is so short. This line, considered in relation to the plane of occlusion, is called the angle of the condyle path, which may

FIG. 2.

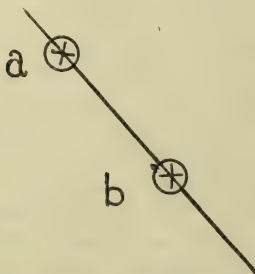


A, Condyle in fossa. B, Condyle forward on eminence. c d, Line of condyle path. This line makes, with the plane of occlusion, the angle of the condyle path.

taken by the condyle as it moves forward and downward from its position in

vary from a very small angle up to one of 50° .

FIG. 3.



a, Position of condyle in socket as located by the face-bow. b, Position of condyle when the protruding bite is taken. (The slot of the articulator connecting these two points makes all movements of the articulator jaw follow this line.)

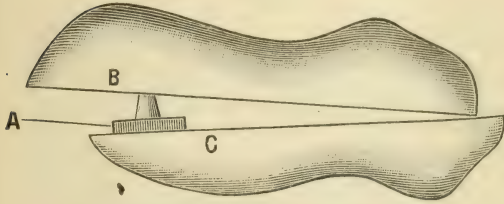
The determining and adjusting of the articulator to this angle is done by means of the protruding bite, with the lower jaw thrust forward as far as possible, after the models have been attached to the articulator in their proper position by the use of the face-bow. (See Fig. 3.)

The angle. The angle is determined by first locating the forward position of the condyle, and as the back position has already been set by means of the face-bow, the condyle path must be in a line between these two points. (Fig. 3.) This path is represented on the articulator by the slot. It is possible to take the protruding bite by adding a little more wax between the heels of the plates and scoring them, just as is done when taking the original bite, but the little

the fossa on to the eminence. This direction, while really constituting an arc,

bite-gages are more convenient, as they not only fill up any space but maintain the relations of the plates as well.

FIG. 4.



A, Bite-gage in position between wax bite-plates B and C as used in taking the protruding bite.

Should the wax bite-plates be trimmed to nearly the right curve, there will be no space between the heels, but the condyle position will be obtained just as accurately. (See Fig. 4.)

DIRECTIONS FOR SETTING UP TEETH FOR ANATOMICAL ARTICULATION.

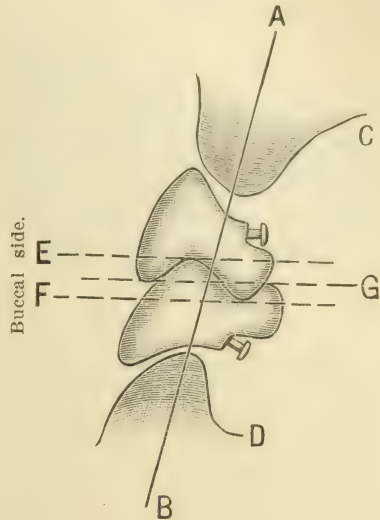
Select long-bite teeth, with a large occlusal surface on the bicuspid and molars. Grind square fissures in the bicuspid and molars with a carborundum lathe stone 3 in. x $\frac{1}{4}$ in. thick, grit B.

Set up, in a full upper and lower denture, all of the upper teeth first, producing the compensating curve; perpendicular bicuspid; the molars—especially the second—slanting (Fig. 5) with their long axes directed to the center of the lower ridge; set the second bicuspid and molars with the lower wax plate removed from the model. The compensating curve is determined by the curve of the lower ridge, or the lower teeth and the angle of the slot in the articulator.

Begin to set up the lower teeth with the second bicuspid, as it is the only tooth occluding between teeth of similar size and cusps; also in order that the occlusion may not be disturbed by the anterior lower teeth being made too wide, which would be the case if the incisors were set up first.

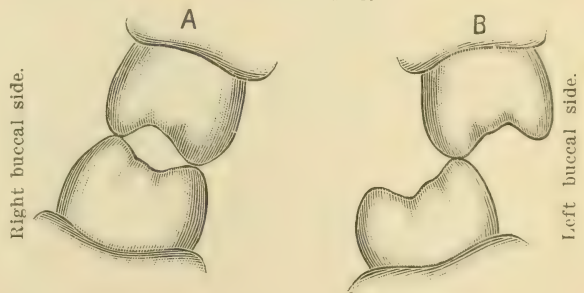
Place the lower second bicuspid in the following manner: First, for appearance, slanting lingually; second, for

FIG. 5.



Shows occlusion, slant, and interlocking cusps. A B, Long axis of teeth arranged between centers of upper and lower ridges, C D. E F, Show difference in height of buccal and lingual cusps.

FIG. 6.



Transverse section of right and left molars. A, Contact of buccal and lingual cusps, or the antagonizing bite on the masticating side. All the molars and bicuspid on this side have this contact. B, Contact of lingual and buccal cusps on the balancing side. This is only for the lower second molar and upper first molar. The others do not touch on this side.

occlusion, grinding if necessary; and third, for articulation—or the antagonizing bite. To get this bite the lower

frame of the articulator is moved to one side, until the buccal cusps of the upper and lower teeth are flush. (Fig. 6, A.)

top of the ridge, and sufficient front and overbite must be allowed.

If the teeth have been ground and

FIG. 7.

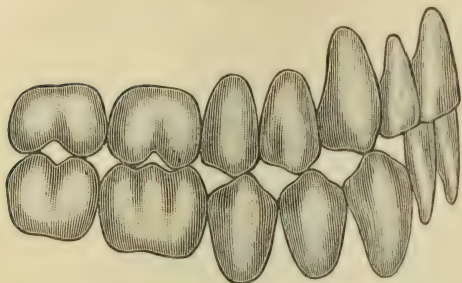


FIG. 8.

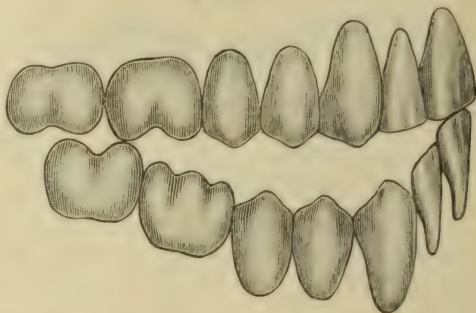


FIG. 7: Masticating side, with every buccal and lingual cusp in contact with its opposite. The condyle is in its socket, but rotated. This position of cusps corresponds to Fig. 2, A.

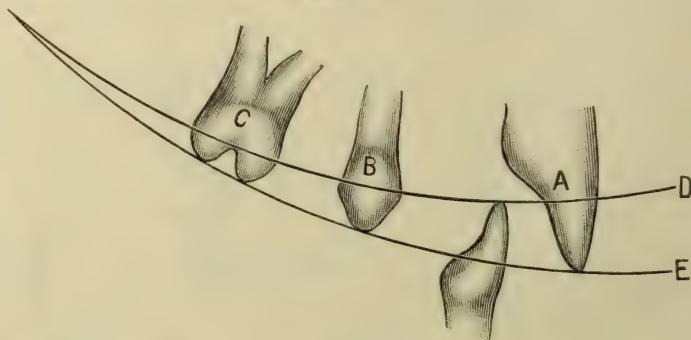
FIG. 8: Balancing side with contact of incisors and molars only. The condyle is in its forward position on the eminence. This position corresponds to Fig. 2, B.

It will usually be necessary to grind the buccal cusp of the lower bicuspid.

After one second bicuspid has been set up in this way, place the opposite one

placed as directed, there will be contact of every buccal and every lingual cusp on the side toward which the mandible is moved (Fig. 6, A)—the masticating

FIG. 9.



Shows decreasing length of cusps from incisors to molars. A, Overbite, or cusps of incisors. B, Shorter cusp of bicuspid. C, Still shorter cusps of molars, shown by lines D E.

in the same manner, and follow alternately with the four molars, being sure of the articulation of each as you proceed.

Lastly, put in place the lower anterior teeth, grinding them narrower or overlapping, as may be necessary. The incisors should be placed directly on the

side—while on the opposite or balancing one there will be only one point of contact, the buccal cusp of the lower second molar with the palatal of the upper first. (Fig. 6, B.) One masticates on but one side at a time when using the lateral antagonizing bite. (Figs. 7, 8.)

Teeth set up in this way do not tilt

or trip in any position into which they may be brought during the movements of mastication, in spite of the fact that they have deep fissures, sharp cusps, and a decided overbite.

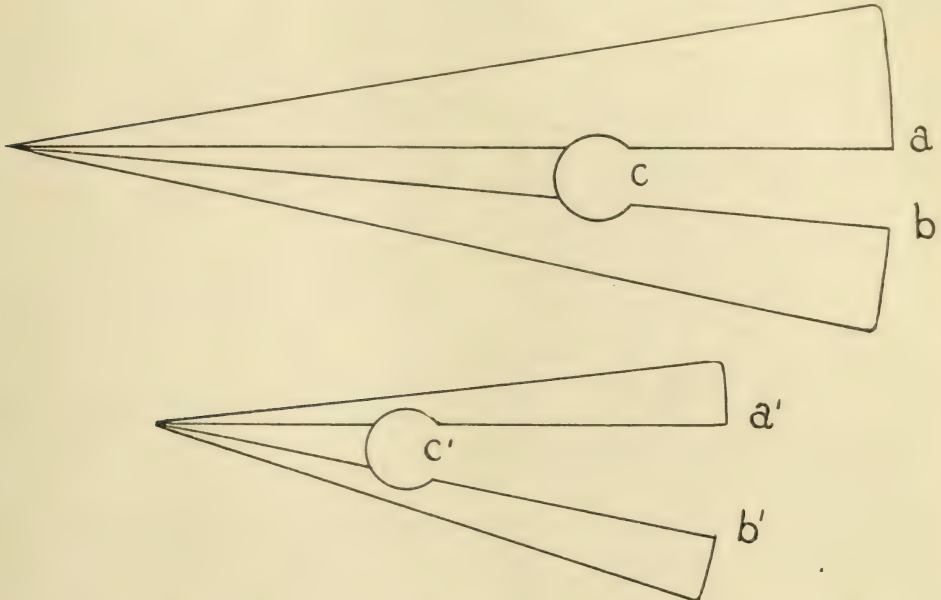
Provided the plates fit well, one can masticate meat with teeth arranged as described as easily and quickly as with natural teeth.

the occlusion and the articulating bites. (Fig. 9.)

As the overbite is increased from an edge-to-edge bite, it is necessary to increase proportionately the front bite—or the horizontal distance between the incisors—otherwise tilting will occur during the incising bite.

The occlusal bite is the old back bite

FIG. 10.



a b, Bite opened on a plain-line articulator. c, Space occupied by the molars, which equals c', representing the space in the mouth. a' b', Shows increased space in the mouth, and failure of the incisors to meet.

Crowns, roots, and facings will not be broken; fillings restoring cusps will not be loosened, and teeth whose position has been changed by regulating will not be driven back, or almost totally prevent the proper masticating movements, if they are anatomically adjusted to the antagonizing bite.

The overbite. The overbite is normally about one-eighth of an inch, and it determines the length of the cusps of the bicusps and molars, gradually shortening to nothing at the condyle. It is very important to graduate the length of the cusps and the depth of the fissures, otherwise it is impossible to obtain both

which everyone tries to obtain. The active antagonizing bite may be said to consist of three positions (there being an indefinite number of intermediate ones), namely, the right lateral, the left lateral, and the incising, and there is always a balancing antagonizing or passive bite on the opposite side. These are the bites which are employed during mastication.

DIRECTIONS FOR THE USE OF THE FACE-BOW AND FOR SETTING THE ANGLE OF THE CONDYLE PATH.

- (1) Take the bite in correct manner.
- (2) Locate the condyles of the patient's mandible.

(3) Adjust the sliding rods of the face-bow equidistant from the ends of the bow to fit snugly against the skin over the outer face of the condyles.

(4) Insert the heated fork of the face-bow firmly anywhere in the anterior surface of the wax.

(5) Place the wax plates, fastened together if possible, in the mouth, directing the patient to bite firmly.

(6) Slip the head of the face-bow over the fork rod and carry first one and then the other sliding-rod-head to its position over the condyle; then, holding the bow firmly, tighten the set-screw in the head, over the fork-rod.

(7) Loosen the sliding rods and remove the wax plates, fork, and bow.

(8) Press the sliding rods in as far as they will go and lock them. The rods will now fit the condyles of the articulator. (Fig. 10.) Set the bite-screw in the usual way, and have the spring control the forward movements of the articulator in tension, and, being sure that the four set-screws holding the bows are tightened by means of pliers, proceed to attach the models in the usual manner.

(9) Remove the face-bow and fork.

(10) Take the wax plates off the models, and warm and press the bite-gages into the lower plate in the molar region.

(11) Insert the wax plates in the mouth and take the protruding bite. The bite-gages fill up any space and maintain the proper position of the plates.

(12) Release the spring and loosen the set-screws which hold the slot-pieces in position so that there is an absolutely free movement of the condyles, not only as a hinge, but also around a radius of half an inch. It is necessary that these slot-pieces move freely.

(13) Place the wax plates, just as they were removed from the mouth, on the models, and gently but firmly press the models into the wax plates, allowing the condyles to assume their position, guided wholly by the wax bite-plates.

(14) While holding the models into the

wax plates tighten the slot set-screws, remove the bite-gages, and attach the spring, which returns the articulator and the models to the original bite position.

The models are then mounted by means of the face-bow in exactly the same relation to the hinge of the articulator as existed between the ridges in the mouth and the condyles of the mandible; and by means of the protruding bite the angle of the condyle path is set on the articulator for each side to correspond to the angle of the jaw, so that with these adjustments the articulator accurately reproduces all of the movements of the mandible, and it is possible to change, open, or close the bite on the articulator without altering its relations when the teeth are placed in the mouth.

The teeth may now be set up, and the occlusion, if taken correctly, and the articulation or antagonizing bite, will be exactly the same in the mouth as on the articulator.

[The foregoing principles of anatomical articulation, including the use of the face-bow, attaching the models to the articulator, taking the protruding bite, and adjusting the articulator to the proper angle, grinding and setting up the teeth and the anatomical application to crown and bridge work, were illustrated by means of two sets of schematic jaws, two articulated models of natural teeth, two articulated sets of artificial teeth, articulated models, including bridges and two crowns, a technic head, a face-bow, four anatomical articulators, a model illustrating the effect of the opening of the bite on a plain-line articulator, and various diagrams.]

A TARTAR SOLVENT ESPECIALLY USEFUL IN PYORRHEA WORK.

By JOSEPH HEAD, M.D., D.D.S., Philadelphia, Pa.

(Read before Section II of the National Dental Association, at its annual meeting, Boston, July 28, 1908.)

DURING the last four years, while testing the decalcifying power of various acids on natural tooth-enamel and cements, I dropped an extracted split tooth covered with black tartar into commercial hydrofluoric acid. On the following day I examined the tooth and found it clean and white, with neither enamel nor cementum in any way harmed, except that the remnants of pericementum on the root had disappeared, and the surface of the dentin was decalcified. Repeated experiments with teeth and hydrofluoric acid confirmed these tests. Then, with the permission of a patient, I tried a very little acid around a loose tooth. It removed the tartar, but its action on the surrounding membrane, as would be expected, was intense and very irritating; and yet, in spite of these drawbacks, satisfactory healing of the pocket occurred and the tooth became distinctly firmer.

I then turned my attention to the hydrogen salts of hydrofluoric acid. The sodium, potassium, and ammonium salts seemed to offer the best fields for investigation, and after a series of experiments, suffice it to say that, of these three, a solution of hydrogen fluorid of ammonium seems to give us exactly what we require. It will dissolve tartar and not dissolve enamel, cementum, or pericementum. It is a colorless and acrid-tasting fluid that can be dried upon the skin without cauterizing. In some instances it causes a slight reddening and tingling, but nothing more severe. It can be injected into a pyorrhea pocket through the root-canal of a tooth that leads to a

fistula or pyorrhea pocket, with excellent results and no sloughing. But if this acid salt is allowed to soak into a dried gum in any quantity it makes a burn as bad as that of carbolic acid. I mention this fact in order that those who use it can take due precaution. The pocket or pockets around the teeth to be treated should be dried, and the gum protected with napkins. The pockets can then be filled with the salt solution, and the rest of the gum in the neighborhood carefully wiped with a piece of cotton. At the end of two or three minutes there will be a slight whitening of the gum around the pocket, with some irritation, when the patient should rinse his mouth with water. It softens lumps of tartar so that they can readily be removed by the scalers, and it dissolves any microscopic bits that are overlooked by the instrument. It also seems to stimulate the gum to healthy action, so that pockets heal up with granulations that adhere to the root, and the loose tooth becomes firm and strong.

The method of manufacture is as follows: Hydrofluoric acid is neutralized by ammonium carbonate until there is complete neutralization of the acid. This solution is then filtered. This liquor is ammonium fluorid and has but little power of chemical action. This ammonium fluorid solution is then evaporated in a leaden dish to one-half of its bulk, filled up to its original bulk with hydrofluoric acid, and evaporated to one-half of its bulk again. This gives us the hydrogen ammonium fluorid of which this paper speaks. It evaporates readily,

distributing its crystals on all adjacent objects, and is extremely difficult to restrain except in a wax bottle. The dried crystals wetted with water do not seem as effective as the original liquor from which water has been excluded.

This solution can be applied either by a pair of tweezers used as a drop-carrier or with a rubber syringe with a platinum point.

If the hydrogen ammonium fluorid is not properly made, and unrestrained hydrofluoric acid is left in this solution, its action will be too severe and may do harm.

The fact that hydrofluoric acid and its hydrogen salts will dissolve tartar and not external tooth-structure is important, and further investigation may give us a tooth-wash and tooth-powder that will really keep the teeth, where there is no porcelain, free from tartar without the constant assistance of the scalers in the hands of the dentist. The fact that hydrofluoric acid will dissolve tartar and not dissolve enamel must prove a puzzle to the most enthusiastic chemical theorist. For notwithstanding the fact that enamel contains a small per cent. of calcium fluorid, both enamel and tartar

are composed largely of the same substances—carbonate and phosphate of calcium. It is equally astonishing to note that a watery solution of carbonic acid or citric acid will cut enamel, although hydrofluoric acid is held to be a giant by comparison. This is as puzzling as the fact that saliva, irrespective of whether it is acid or alkaline, sometimes protects the enamel from decalcification and sometimes does not.

These three chemical anomalies are among thousands of similar incongruities that are constantly occurring in the human economy. They give rise to tantalizing and inspiring problems, but at the same time they should give pause to some of our modern chemical theorists, who would solve the complicated reactions of faulty metabolism by the simple formulas of inorganic chemistry.

I have merely given the results of experiments that have extended over three years, and these results I have withheld for a year in order that I might give this hydrogen ammonium fluorid a thorough therapeutic trial. I am so sure of its value that I want to have the whole dental profession share the knowledge of it with me.

A METHOD OF TREATMENT OF PURULENT EMPYEMA OF THE MAXILLARY SINUS.

By CLYDE DAVIS, M.D., D.D.S., Lincoln, Nebr.

(Read before Section III of the National Dental Association, at its annual meeting held at Boston, Mass., July 28, 1908.)

IT is not the intention of the writer at this time to deal extensively with the etiology, semeiology, or diagnosis of this generally well-recognized disease, but in as brief a manner as possible to present to the profession a method of treatment which has proved unusually successful, and one which we believe has

some new features as to the surgical procedure and the therapeutic means which will appeal to all as being more harmonious with the principles of surgery in general than the methods usually advocated.

Infection is introduced either through the normal communicating openings to

accessory cavities or through the dissolution of the continuity of its lining membrane.

By the first route the greater majority of cases is infected through the antra-nasal openings. Bacteria are first taken into the nasal cavity in the act of inhalation, and subsequently forced through the foramen by the pressure produced in blowing the nose. A favorable soil for their subsequent development is oftentimes found previously prepared by former irritation, or through the communication to the sinus of inflammatory changes in the Schneiderian membrane of the nasal cavity, which also lines the antra.

As to the penetration of the walls for infection, by far the most frequent causes are diseased conditions about the roots of the teeth.

As to the means of diagnosing the presence of pus in the maxillary sinus, we should place more reliance upon the reflection of light than upon any other one thing, yet being mindful of the symptoms usually considered pathognomonic. The effects of reflection are best obtained by putting the patient in a dark room and having him close his lips over a small electric light bulb. If the sinus in question be entirely or partially filled with any substance other than air, it will be dark and no light will be transmitted, whereas if it be normal a delicate pink light will outline the entire cavity.

After having decided that the sinus is diseased, the first thing of importance is to see that the antra-nasal opening is free, and if not, to surgically render it permanently open, for as long as the sinus exists as a cavity it must have permanent and sufficient drainage, healthy or otherwise, since even in a state of health the sinus and the communicating frontal and ethmoidal cavities must have an exit for their normal secretions. This is imperative, and there is no use in attempting to effect a cure with the hiatus closed, for this in itself will act as a cause for speedy recurrence as long as the cavity exists.

Having established the antra-nasal opening, the rhinologist many times will

effect a cure by thorough irrigation through this opening, provided the infection has been communicated through the nose.

But frequently this is not the case, and a more thorough exploration and drainage is indicated, therefore we decide to make an external opening, which for cosmetic reasons we elect to make through the oral cavity. Unfortunately, this cavity is usually far from sterile, and proves a source of great danger from secondary infection. As soon as we have made a communicating opening we proceed to explore, locate the source of infection, if possible remove the exciting cause, and then look for a permanent healing and closure of the wound.

Just at this point the writer has many times recalled the story of the man who did not like his pastor's preaching, which was much on the order of "You will be damned if you *do*, and you will be damned if you *don't*." If you close the oral opening, drainage ceases and the disease recurs. If you do not close the opening the case is not well. In other words, it is not well while open and it will not heal if closed.

To secure an antrum which is closed yet open, many schemes have been devised, such as drainage tubes, tampons, etc. It was right at this perplexing point that the writer conceived and tried the following method, which has given excellent results with no failures, even in extensive incisions.

The first oral opening is generally exploratory and need be but small; it can be readily closed by the method indicated and it will suffice, should simple drainage and thorough irrigation be sufficient for resolution.

The lip is raised to its full height and a semilunar flap is cut through all the soft tissues, including the periosteum, with the unsevered part upward. With a periosteal scoop this flap is then dissected from the bone. Then, with a spear-shaped drill, pointing upward and backward, the bony wall is punctured and enlarged to about three-sixteenths of an inch in diameter. The sinus is then explored in every part with a flex-

ible blunt short probe to assist in the diagnosis of the cause. If a more extended operation for the removal of foreign bodies, or curettage in cases of denuded walls—as in necrosis—is demanded, proceed to enlarge the opening by extending the cut in the soft tissues mesio-distally; dissect and remove the bony wall above the incision.

Having completed the operation indicated, proceed to irrigate all the soft tissues, and sterilize with the usual non-irritating antiseptics. Then fill the entire cavity with normal salt solution, and immediately approximate the soft tissues. Dismiss the patient without packing except in extensive operations and curettages, when the cavity should be entirely packed with a tape of gauze as an absorbent of capillary hemorrhage. As long as the incision remains open there is ample drainage and ample means of irrigation.

As soon as the soft tissues close—and the sooner the better—irrigate by means of a hypodermic syringe, puncturing the soft tissues each time in a new place, previously sterilized. The bony wall will be slow in re-forming; days in small openings, and sometimes weeks in large openings, will intervene between the closing of the soft tissues and the

bony lesion, during which time the sinus is closed to infection from the oral cavity, yet open to the hypodermic needle for irrigation. Should the bone close sooner than desired, the soft tissues may be punctured with an instrument such as a sterile excavator, and by a twisting motion the callus may be broken up and the previous conditions for treatment prolonged for ten days or two weeks. By this means the writer has been able to easily pass over a very critical time in antrum treatment, and effect permanent closures in cases that had persistently recurred just at the time when final closure had taken place, due to the inclusion of infectious matter within the cavity.

As to the normal salt solution: Most antiseptic solutions, as is well known, are very irritating to the highly sensitive Schneiderian membrane. Again, one of the best home treatments for nasal catarrh is a spray with salt solution. By these facts the writer was induced to flood an antrum, just before dismissing the patient, with the normal salt solution. The result was so gratifying that all cases are now so treated, resulting in materially shortening the course of treatment, and increasing the percentage of permanent cures.

THE PROTECTIVE SUBSTANCES OF THE BLOOD IN THEIR RELATION TO PYORRHEA ALVEOLARIS.

By ARTHUR H. MERRITT, D.D.S., New York.

(Read before Section III of the National Dental Association, at its annual meeting, held at Boston, Mass., July 28, 1908.)

IN the study of disease phenomena, especially those in which bacteria are an etiologic or complicating factor, it is of prime importance, in the formulation of therapeutic measures for their relief, to inquire into the means of defense provided by Nature, in order to

ascertain if we may not, through co-operation with her in combating such disease, enlist in our service forces more potent than any which might be employed were we to disregard them; for it will always be found true that the measure of our success will be just in

proportion as we are successful in interpreting her methods and as we direct our treatment toward supplementing and enforcing them.

Such a study necessarily involves a consideration of many of the fundamental problems of pathology.

Experimental bacteriology has added so much to our knowledge of inflammatory processes as to materially change the viewpoint of a decade ago. We can no longer regard inflammation as a destructive process. It may be, and usually is, a danger signal, but by no means necessarily a danger. In whatever way it expresses itself it must be regarded as being a salutary process, and this notwithstanding the fact that it may not always be successful in accomplishing the desired results. In line with this conception of inflammation is the definition of Adami,* in which he describes it as "the series of changes constituting the local manifestation of the attempt at repair of actual or referred injury to a part, or, briefly, as the local attempt at repair of actual or referred injury." It is of the utmost importance, therefore, that we keep clearly in mind the fact that inflammation is a physiological process, physiological in so far as it is the calling into action of properties normally possessed by the tissue involved.

It is also essential to its clear understanding that the multifariousness of the process be not overlooked. It is not to the leucocytes alone, or to vascular changes, or to altered temperature, or to reaction on the part of the fixed cells of the part, that we are indebted for repair within the affected tissue. Every agency at Nature's command is employed against the irritant. "The cells of the body, fixed and free, play their part; the nervous system aids the process; the bodily humors render efficient help; modification in the vessel walls and blood stream are valuable auxiliaries. Diverse processes are employed, now one more particularly, now another, according to the needs of the moment, but none

exclusively,"* all directed toward the one end, *i.e.* healing within the affected area.

Given the presence of pyogenic bacteria within a tissue, certain well-known phenomena will be noted, such as the slowing of the blood current within the affected zone, a dilatation of the capillaries and veins, a crowding of the corpuscles along the walls of the vessels and their migration into the surrounding tissue spaces—an act not confined to the leucocytes, but one which includes large numbers of the red cells, though this action on their part is purely passive, due to changes in the blood pressure and to lack of continuity of the capillary walls. This outpouring of the cellular elements is accompanied by a fluid exudate resembling in chemical composition the blood plasma, and which varies according to the affected tissue, the nature of the infecting organism, and the reactive ability of the infected individual. This exudate possesses of itself bactericidal power sufficient to make it inimical to certain forms of germ life, though it is probable that it exercises little if any restraining influence upon pyogenic organisms. It also has a diluent action upon bacteria, limiting their power by washing their toxic products out of the lymph circulation.

If careful observation be made of the migrating leucocytes it will be noted that they are definitely moving toward the seat of infection—that the invading bacteria have for them a peculiar attraction, one which has been characterized as positive chemiotaxis. It is this same stimulus, having its origin within the area of irritation, which reacts upon the vessel walls, especially upon the endothelial cells lining the capillaries, bringing about changes which facilitate the emigration of the leucocytes. This action on the part of the leucocytes, as described by Metchnikoff, is for the purpose of destroying the bacteria, a belief which has come to be generally shared by all pathologists, it being accepted that the phagocytic activity of the leucocyte constitutes its most important function.

* "Inflammation," p. 228.

* *Ibid.*

The researches of recent years have shown that the invasion of the infected zone by leucocytes does not necessarily mean phagocytosis. Other conditions are essential to the performance of this function. The bacteria must themselves be acted upon before they can be taken up by the leucocytes. An examination of the blood plasma reveals the presence of a large group of bodies known as agglutinins, which possess the power of agglutinating or holding together in clusters the bacteria, in this way facilitating the phagocytic activity of the leucocytes and exercising a salutary influence in limiting the spread of infection. But more than all else, and absolutely essential to phagocytosis, is required the presence of still another group of substances found in the blood plasma in greater or smaller quantities, and one which is all-important in pyogenic infection. To these substances Sir A. E. Wright, who with Leishman was the first to study them, gave the name of opsonins. Their exact nature and just how they influence phagocytosis, other than that they in some way prepare the bacteria for ingestion, is unknown, but that the persistence of many types of chronic purulent inflammation is due to a deficiency of these bodies there would seem no longer to be any doubt.

These in brief are the instruments with which Nature fights infection. The question which naturally arises is: Why is it that she is not always successful? It is a common observation that pus processes tend to become chronic, that one boil is followed by another, etc. We know that it is not due to a deficiency of leucocytes, for the formation of pus anywhere in the body, if of any extent, is immediately attended by an increase of the white cells. We know also that the phenomena which attend inflammatory processes are not wanting, such as increased blood supply, extravasation of leucocytes, etc. The researches of Wright have thrown much needed light on this point, showing that it is not to these things that we are to look for the breaking down of Nature's protective forces, but to an insufficiency of opsonins in the

circulating media. It is his belief, now accepted by many others, that it is this factor which is responsible for many types of chronic pus infection, and that in many instances these may be cured by raising the opsonic standard; that is, by stimulating the production of opsonins by means of the inoculation of bacterial vaccines.

If we now turn to the antiseptic method employed in combating bacterial infections, we cannot fail to be impressed with its limitations, in whatever light we consider it. The internal administration of antiseptics for the purpose of inhibiting or extinguishing microbial growth within the organism is by common consent acknowledged to be of no avail, unless we accept the belief now entertained by some observers, that we owe the curative effect of quinin in malaria and mercury in syphilis to their germicidal action, and make an exception in these diseases.

Significant also is the fact that they have been largely abandoned in the treatment of ordinary surgical wounds. In their local application, in the words of Wright, "It is axiomatic that antiseptics can take effect only on those bacteria with which they come in contact. It is obvious also that in the case of the skin and mucous membranes the infecting bacteria will not all lie on the surface, and that they will not, even though lying on the surface, be limited, with respect to their distribution, to those regions which are accessible to antiseptics. It follows, therefore, that it will be unreasonable to expect from any application of antiseptics anything in the nature of complete sterilization; in every case there will remain a residue of surviving bacteria, and the survivors will inevitably multiply and reoccupy the disinfected surface. And this is not all. The antiseptic will not, as the unthoughtful assume, add its anti-bacterial power to the anti-bacterial power of the living organism, but on the contrary will directly antagonize the protective forces which the living organism has at command; it will paralyze the phagocytes and abolish the anti-bacterial power of the blood fluids. By the action

of the antiseptic the disinfected surface will thus be left swept and garnished for reoccupation by the expropriated bacteria. And again this is not all. The antiseptic application will also injure the histologic elements, and in particular the capillaries of the tissues to which it is applied."* They also injure the cells of the tissue, seriously interfering with their reactive forces. These factors are too often overlooked in the application of antiseptics in dental practice.

Is it strange, then, that all the more thoughtful workers in this field should direct their attention toward the protective forces with which the living organism is equipped, with a view to ascertaining if they may not, by its scientific exploitation, summon to their aid agencies more efficient in fighting bacterial infection than any which have hitherto prevailed?

In the study of pyorrhea alveolaris one is brought face to face with what is perhaps the most typically chronic pus infection to be met with in the human body, a disease which is responsible for the loss of more teeth than all other known causes, and one which is directly or indirectly responsible for many systemic disorders of a grave nature. An attempt will not be made at this time to discuss the etiology of pyorrhea. It is sufficient for the purpose of the moment to call attention to the fact that all writers on the subject are agreed in this, that the micro-organisms of the human mouth are in every instance a complicating and perpetuating factor in the progress of this disease, and while some are inclined to give them first place as causative agents, all seem willing to accord them second. Whatever may be their influence, there is little doubt that if the rôle played by them could be controlled, a great advance would thereby be made toward its successful treatment. The question which naturally suggests itself in this connection is: Why is it that Nature's defensive machinery offers a no more effective resistance to the pro-

gress of this disease? McKenzie* has answered it by saying that in pyorrheal infections phagocytosis is invariably absent, and that this is accounted for by a deficiency of opsonins in the fluid exudate, which condition not only predisposes but invites chronicity. Other investigators—and notably Goadby†—claim that bacteria are frequently present in the leucocytes of pyorrheal pus. From these and other observations one thing would seem reasonably certain—that in many cases of pyorrhea, phagocytosis is at best but an indifferent process; that the micro-organisms, meeting as they do with little or no active resistance, may be regarded as the chief obstacle to success in the treatment of this disease. In a series of studies along this line undertaken by Goadby‡, some very interesting facts have been revealed. The cases selected by him were those of undoubted pyorrheal infection. Several presented more or less marked constitutional symptoms, such as anemia, neurasthenia, and gastro-intestinal diseases. There were also several in which there was a fairly marked leucocytosis. The bacteriological investigations, while confirming the mixed nature, showed that bacteria belonging to the staphylococcal group were the most constant in their presence. It was this group which was tested against the patient's serum in determining the opsonic index. In any given case this is accomplished thus:

First, a sufficient quantity of the patient's blood serum is obtained, together with that of a normal person. This is done by a puncture of the finger-tip, or the lobe of the ear, and the blood is drawn into a glass pipette of small diameter, the ends are then sealed and the clot is allowed to form and separate. A few drops only are required.

Second, white blood-cells are obtained which have been thoroughly freed from the plasma in which they normally float. It is a matter of indifference whence the

* J. J. McKenzie, *Dominion Dental Journal*, May 1907.

† *Lancet*, March 9, 1907, p. 633.

‡ *Ibid.*

* "Principles of Opsonotherapy," *Journal A. M. A.*, August 10, 1907.

blood for this purpose is obtained, provided only that it is not from a person suffering from diseases of the lymphatic system. The blood so obtained is, after dilution with a solution of sodium citrate to prevent coagulation, transferred to a centrifuge tube and thoroughly centrifugalized. By this method the leucocytes are separated from the red cells and blood fluids, and made ready for use.

Third, an emulsion of the bacterium is secured toward which the opsonic index of the patient is to be determined. This emulsion, with few exceptions, should be freshly prepared. The infecting organism having been obtained, a culture is made on an appropriate medium, from which the emulsion is prepared. The leucocytes, emulsion, and patient's serum are then brought together in definite proportions, and after thorough mixing are sealed in glass tubes and kept at blood temperature for about fifteen minutes. Films are then prepared for microscopic examination and the number of bacteria contained in each leucocyte noted until 100 such leucocytes have been counted. This is also done with the emulsion made from the normal serum. This having been accomplished, the number of bacteria found in 100 cells of the patient's slide is divided by the number found in 100 cells of the normal slide—the result shows their respective indices.* The normal opsonic index is placed at 1, from which there is little deviation in health. This is a purely arbitrary standard.

The opsonic index having been taken, a vaccine of the same nature as the infecting organism is prepared. As a rule, the best results are obtained when organisms from the patient's own lesion are employed. This vaccine consists of an emulsion of bacteria in nutrient broth or salt solution, in which all the organisms have been killed, usually by heat. The inoculum will vary in amount from 0.05 to 1.0 ccm. The number of dead bacteria injected will depend upon the opsonic index and the nature of the infecting organism.

Thus in gonococcal infections the initial dose would be about 50,000,000, while 250,000,000 to 500,000,000 would be the numbers employed in staphylococcal infections. The inoculation is usually attended by a lowering of the index, and not infrequently an exaggeration of the symptoms attending the disease. This may be slight, lasting only a few hours, or it may extend over several days; it is known as the negative phase. If the dose has been properly estimated this will be followed by a rise in the index which will probably carry it several points above normal, where it will remain, with slight variation, for several days or weeks. This is spoken of as the positive phase.

These inoculations are repeated with sufficient frequency to maintain an increased opsonic index during the period of treatment. The result is an increase in phagocytic activity, dependent upon an increase in the opsonic power of the blood fluids, and is usually attended with marked improvement in the disease. By this method a degree of immunity against the infecting organism is secured. Now, immunity may be and frequently is brought about in certain infectious diseases through auto-inoculation, bacteria in sufficient numbers finding their way into the blood stream and thereby increasing its bactericidal power and conferring a degree of immunity the duration of which is dependent upon the nature of the infecting organism and the reactive ability of the patient. This is notably true of such diseases as tuberculosis and gonorrhea. It is this factor which is being taken advantage of in England* in the treatment of pulmonary tuberculosis with most excellent results, where through the instrumentality of carefully graduated labor, auto-inoculations are artificially induced, immunization against the infecting organism being thus secured.

Of the thirty-six cases examined by Goadby, twenty-nine were found to possess an opsonic index subnormal in varying degrees. In the treatment of these

* Allen, "Opsonic Method of Treatment."

* *Lancet*, January 25, 1908.

cases with bacterial vaccines, he found that after the preliminary negative phase—which was attended by symptoms of an exceedingly mild nature, disappearing within twenty-four to forty-eight hours—improvement in the general symptoms was manifest and invariably preceded local improvement. Local treatment, such as curettage, removal of calculi, etc., was instituted in each case, with the result that in two cases in which the question was directly tested the healing of the local parts in the immunized patient was four times as rapid as in the same patient before immunization. In a large proportion of those treated by him, in which the teeth were not all affected to the same extent—and this is true of most cases presenting for treatment—he found the employment of bacterial vaccines particularly satisfactory. The following quotation may be said to fairly represent his conclusions: "Local applications, curetting, electrolysis, and many other methods have been recommended for treating the local disease, all of them being directed toward removal of local agglomerations of bacteria, calculi, and debris, and the enjoinder of constant care on the part of the patient after such treatment has cut short the disease in the earlier and much ameliorated it in the later stages; but as long as lowered resistance to the infective organism remains so does the disease progress. These facts, and the consideration of the bacteriology of the disease, point to the urgent want of some method by which the general, as well as the local, infection may be attacked."

Similarly good results are reported by Carmalt-Jones, Humphreys, and Wright.*

If we now briefly consider the local conditions as they prevail in pyorrhea, we find other reasons which may aid in explaining the ineffectiveness of Nature's protective forces in their relation to this disease. With the advent of inflammatory changes in the pericemental tissues, there is coincidently an involvement of the bloodvessels, which as the disease

progresses results in their more or less complete obliteration, a condition which is not confined to the pericemental membrane, but one which gradually extends itself to the alveolar process. Inevitably there follows a diminution in the blood supply, with corresponding diminution in the exudate as it is poured into the infected zone, which decrease means a deficiency in the bacteriotropic substances at the seat of infection.

Another possible cause may be the calcium salts present in the deposits upon the roots of teeth affected with pyorrhea. We know that calcium salts are essential to the coagulation of the blood. We know also that in certain infections a high calcium content of the blood stream, because of its coagulating effect, so interferes with the fluid exudate as it is poured from the vessels that it exercises little if any restraining influence upon the infecting organism. Just what would be its influence under conditions such as exist in pyorrheal pockets would be difficult to say, but it is not altogether unreasonable to suspect that in certain cases it exercises a restraining influence upon the free flow of the fluid exudate within the infected area, in this way interfering with the phagocytic activity of the leucocytes. Still another factor is that which is more or less common to all foci of bacterial infection, viz, a deficiency of anti-bacterial substances within such foci, due to their absorption by the organisms, a phenomenon which always takes place whenever blood fluids are brought into contact with bacteria. It would seem probable, therefore, that whatever may be the success attendant upon local treatment, such as curettage, the employment of counter-irritants, antiseptics, massage, etc., it is largely obtained because such treatment has been instrumental in the determination of an increased blood supply to the parts, because in such treatment—no doubt unconsciously in many instances—there has been in some small measure an augmentation of Nature's reactive forces. Just what place opsonotherapy will take in the treatment of this disease is a question which cannot at this time be answered.

* *Lancet*, December 28, 1907, p. 1818;
Journal A. M. A., August 17, 1907, p. 572.

Our present incomplete knowledge of Nature's reactive forces in bacterial infections, the elaborate technique involved in determining the opsonic index—requiring the co-operation of one skilled in laboratory work—and the difficulty of maintaining a high standard for any considerable length of time, very much limit if they do not altogether prohibit its general employment.

But whatever may be the therapeutic method employed, whether it be Bier's method of induced hyperemia, or that of Mikulicz, viz, of injections to increase the resistance period, or the employment of bacterial vaccines as indicated by Wright, it is essential that it be based on the assumption that inflammation is first, last, and all the time a local reaction to injury, and that successful treatment must therefore be directed toward stimulating and augmenting those reactive forces.

In conclusion, it is sufficient to call attention to the fact that in the protective substances of the blood we have a

most efficient instrument for the treatment of purulent inflammatory processes, needing only to be intelligently directed to that end; that in consequence of the impairment of such substances we find the circulatory system to be the chief factor in the chronic and progressive nature of pyorrhea alveolaris, permitting the ever-increasing and multiplying activities of the micro-organisms that are omnipresent in these cases; that whatever may be the influence of diathetic or other constitutional vices, they express themselves in every instance through the circulatory system; that our present antiseptic methods, while a great advance over those which prevailed prior to their introduction, must be conceded to be a crude, and in many cases, a wholly inadequate instrument with which to fight bacterial infection; that, whatever the therapeutic measures employed, their success will be found in every instance to be proportioned to the accuracy with which they interpret and conserve the reactive forces of Nature.

THE ORAL MANIFESTATIONS OF SYPHILIS.

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(Paper read before the joint meeting of the Fifth District, N. Y., and Jefferson County Dental Societies, Watertown, N. Y., November 6, 1908.)

WITH the single exception of tuberculosis, syphilis is the most widespread disease; it is limited to no age, sex, or race. Its sole claim to respectability lies in its great antiquity and prominence in history. The presence of syphilis was felt in Egypt in 3500 B.C., and it figures in the writings of Moses, Celsus, David, Hippocrates, Pliny, and Josephus. It was found in America by the sailors of Columbus.

The determination of the prevalence of syphilis in our own age is difficult, be-

cause of the secrecy observed by both patient and physician. Statistics on this subject are necessarily incomplete; but Sanger in 1892 estimated that there were 100,000 syphilitics out of a population of 1,800,000 in New York city, and in 1905 it was estimated that of a population of 3,500,000 there were 200,000 syphilitics. Every physician or dentist sees enough to convince him that a considerable number of those with whom he comes in contact each day are affected with this disease.

The important relation of the dentist to syphilis lies in the fact that frequently the first and sometimes the only manifestations are found in the mouth, where they may be observed by the dentist, though not noticed by the physician or suspected by the patient. The dentist, too, is an important factor in the treatment of the disease, and the first step in the treatment should be a thorough cleansing of the mouth; throughout the course of the treatment the dentist should co-operate with the physician by frequent inspection of the condition of the mouth and teeth. The ability to recognize syphilis is essential to the dentist in order that he may protect himself and his patients from infection; for there are no more virulently contagious lesions than those appearing in the mouth, and none from which transmission of the active cause can take place in so many ways in the round of everyday life. The eating utensils, napkins, towels, cups, pipe, or the connubial kiss may be unsuspected means of conveyance of the disease. It must be borne in mind that syphilis is by no means always a venereal disease, but can be innocently conveyed by one who is careless or ignorant of the cause of his trouble by many means.

The first oral manifestation of syphilis which attracts our attention is the *chancre*, which appears most often on the lip, more rarely on the tongue or ton-

of the lesion itself. When it first appears, the chancre may be nowise different from an ordinary abrasion or fever blister, but any persistent ulcer not due to a known cause, which is indolent, not painful or destructive, shallow, and covered by a grayish pseudo-membrane, should be regarded with grave suspicion, and if it be followed in five to ten days by moderate, non-inflammatory swelling of the adjacent lymph glands, the diagnosis is practically absolute. Chancre located upon the lip may cause great swelling of the lip, so as to interfere with speech and eating.

Chancre on the tongue is more rare than on the lip, and is usually located at or near the tip and so modified in its characteristics by friction and the constant motion of the organ that the diagnosis is often most difficult. The glandular involvement following a chancre in this location appears first in the glands under the angle of the jaw.

Perhaps the most constant characteristic of chancre is the parchment-like induration noticed on rolling the tissue between the finger and the thumb, but even this is not always reliable, for it must be remembered that any simple sore may become indurated following cauterization with silver nitrate or strong acids.

A confusing differential diagnosis is that between epithelioma and chancre of the lower lip. The classical scheme of diagnosis is—

Chancre.

Occurs at any age.
Painless.
Regular in outline.
Elevated edges and crater-like excavation.
Duration a few weeks.
Submaxillary glands involved in the second week.
Yields to mercurial treatment.

Epithelioma.

Usually past middle life.
Frequently stabbing pain.
Irregular in outline.
Ragged and bleeding.
Duration months or years.
Glandular involvement late.
Not affected by mercury.

sil. On the lip it is placed usually at the muco-cutaneous junction, where breaks of the skin surface due to cracks, herpes, or burns from cigars are most common. A history of the exposure to the infection is rarely obtainable, and the diagnosis must be based upon the characteristics

The chancre persists until the appearance of the lesions characteristic of the secondary stage, usually about three weeks after the chancre, though this period varies within wide limits. It is then a generalized blood disease, therefore we have usually an eruption distributed over

the whole skin and mucous surface, with a tendency to be symmetrical. Some authorities claim that preceding the general eruption by several days there may be observed on the mucous membrane of the palate, palatal arches, and pharyngeal walls, a number of faint grayish-yellow lines marking the course of the small vessels and due to cellular proliferation about them, the surrounding mucous membrane being a brighter red than its normal color.

The characteristic mouth-lesion of the secondary stage is the *mucous patch*. This is similar to the hard papule of the skin surface, and is caused by excessive cellular proliferation about the small bloodvessels, which finally becomes so massive as to cut off the blood supply to the outer layer of cells; this layer dies and rubs off, leaving a moist surface which is grayish in color because of ischemia, due to the choking-up of the blood channels. A hard papule in any part of the body which is exposed to similar conditions of heat, moisture, and friction will become a mucous patch.

This lesion is located usually on the mucous membrane of the inner surface or frenum of the lips or the angle of the mouth; but it may be on the tongue, buccal mucous membrane, palatal arches, or palate. In appearance it is not unlike the effect produced by touching the mucous membrane with a silver nitrate stick; it is only slightly indurated, grayish-white, irregular in shape, not elevated, and is painless unless irritated by a ragged tooth, or unless so situated, as in the faucial pillars, that it is constantly in motion during breathing and swallowing. It is found more frequently in men than in women, possibly because the women are more fastidious in the toilet of the mouth and less prone to use irritating substances, such as cigars, tobacco, or strong liquors.

This is the most dangerous lesion of syphilis, and must be remembered in order that it may be avoided. It is at present considered that the saliva and other physiological secretions do not transmit syphilis, but an unnoticed mucous patch may add its secretion to the

saliva and thus make it a most dangerous carrier of infection.

It is customary for the physician to wait for the appearance of the secondary eruption before making a positive diagnosis of syphilis and beginning treatment. Immediately upon its appearance the patient is prepared for mercurial treatment, and this is usually the point at which the dentist first sees the case. Every patient who has a tooth or a part of a tooth, or who wears a plate, should be sent to the dentist before mercurial treatment is started; the dentist should be notified as to the character of the case, so that he may do his work most intelligently and take all precautions to safeguard himself and his *clientèle* from any danger of infection.

The knowledge of the nature of his disease usually places the patient, especially if he is an educated or cultured person, in a pitiable state of mental depression, in which his thoughts often turn toward some desperate means to end a life of disease which he feels will be worse than death. He is a sick man mentally as well as physically, and must be given every possible encouragement. There is much to be said in his favor, for syphilis tends somewhat to be a self-limited disease, is not immediately fatal, but runs a long course; its sequelæ are serious, but there is fairly good assurance that they can be prevented by faithful adherence to the routine of treatment. On the other hand, the patient must not be led to think too lightly of the disease, but must be impressed with the fact that it may lead to the direst consequences for himself and others if he fails in his observance of the details of the treatment.

During my term of service as dental surgeon at the Philadelphia Hospital nearly every patient selected for mercurial treatment was sent to the dental department before treatment was commenced, in order that his mouth might be placed in the best possible condition. Later, while resident physician in the same hospital, every patient in my wards had his oral condition inspected carefully before and during his course of

mercurial treatment. The surprisingly small number in which salivation or stomatitis developed, and the facility with which these few were controlled, impressed me with the great importance of the condition of the mouth during the administration of this drug. The principle in the treatment of this disease is to get a large quantity of mercury into the system; the limit of administration of mercury is indicated by salivation and stomatitis, which may be alleviated or prevented by proper oral hygiene. Therefore the better the mouth-conditions the more mercury we may give, and the better the patient's chances of recovery and of escape from the sequelæ of his disease.

When a syphilitic patient is referred to the dentist, the first step is to remove all roots, smooth off all sharp edges, remove calcic deposits, and any other possible causes of abrasions. If there are abrasions, they should be allowed to heal before treatment is begun. A paste or powder should be prescribed, and instructions given to brush the teeth thoroughly after each meal with a moderately stiff brush. A mouth-wash, mildly antiseptic and astringent, will be found of value. Personally I prefer the following:

R—Fluidextracti krameriae, 3j;
Tincturæ myrrhæ,
Alcoholis, āā 3iij. M.

Sig.—One half-teaspoonful in half-glass of water *p. r. n.*

Dr. Truman's prescription is also valuable:

R—Hydronaphthol, 3ss;
Glycerini,
Alcoholis, āā ad 3iij;
Olei gaultheriæ, ℥x. M.

Sig.—Twenty drops to a half-glass of water.

During the course of the treatment the patient must stop chewing or smoking tobacco and must avoid strong liquors and highly spiced foods or sauces. Our aim is to keep the mouth as clean and as resistive to infection as possible, so

all such irritating substances must be avoided.

Should salivation or stomatitis develop in spite of our precautions or because of their neglect, the mercury should be stopped at once, and the mouth again examined for any source of irritation. The drugs of greatest value are hydrogen dioxide and chlorate of potash. A valuable mouth-wash consists of

R—Sodii boratis,
Tincturæ myrrhæ, āā 3ij;
Potassii chloratis, 3j;
Aquæ destillatæ, ad 3xvj. M.

Sig.—Use as mouth-wash.

This is mildly antiseptic and astringent, and does away with the fetor of the breath. Hydrogen dioxide in three per cent. solution is valuable, often producing a quick change for the better when potassium chlorate seems inefficient. Ulceration should be cauterized with silver nitrate or an aqueous solution of chromic acid.

The administration of mercury should not be recommenced until the mouth is once more in a healthy condition. Then the regimen should consist of frequent use of one of the milder washes first mentioned, and of careful attention to cleanliness after eating.

The *tertiary lesions* of syphilis may appear months or years after the primary and secondary lesions have disappeared; they are usually unilateral, and may occur in any kind of tissue or any part of the body. In the region of the mouth a gumma may affect the palate, alveoli, mandible, or soft tissue.

In the bone it begins as an osteoperiostitis with round-cell infiltration underneath the periosteum, which may organize and remain as a nodular thickening; but more often it softens, ulcerates, and leads to necrosis and perforation. The premonitory sign is a boggy or edematous mucous membrane of a dusky liver color, the center of which ulcerates and breaks down, producing a moderate amount of thick pus. When this appears first on the oral side of the palate, the process may sometimes be halted by the prompt administration of

mercury and iodid in large quantity, but usually it goes on to necrosis of the bone. The soft tissues may melt away with astonishing rapidity, so that the bone is exposed within a couple of days after the discovery of the lesion. Occurring in the alveolus, the process runs a somewhat slower course; here we have first the dusky, boggy, liver-colored mucous membrane, followed by loosening of the teeth and denudation of the bone.

Syphilitic necrosis of the bones in this location is sometimes hard to differentiate from tubercular necrosis, especially in the not uncommon occurrence of tuberculosis and syphilis in the same person. Tuberculosis, however, is not prone to affect the bones of these parts unless it is very widespread; it is usually accompanied by more suppuration than syphilitic necrosis, and tends to involve the adjacent joint, and it is not improved by the administration of mercury.

Gumma of the soft palate is first indicated by sore throat and interference with speech and swallowing. Here again we have a boggy, dusky red mass which tends to ulcerate and perforate. Appearing in the tongue, a gumma may manifest itself as a diffuse glossitis with considerable thickening or as a circumscribed lesion, which may be single or multiple, superficial or deep.

The local treatment of necrosis consists of waiting and keeping the parts as clean as possible pending the formation of the line of demarkation and the loosening of the dead portion. Hydrogen dioxid is not to be recommended here, because it dissolves the new capillaries forming along the line of separation, and thus delays the process of sequestration. A mild antiseptic wash used hourly is better. Removal of the necrosed bone should not be attempted until the dead portion is entirely separated from the living bone; it should be removed with the least possible injury to the velvety layer of capillaries and new tissue which has formed between it and the healthy bone, and which is of the greatest importance in the nourishment and repair of the latter. Such pieces of bone can almost always be removed from within the

mouth, an external incision rarely being necessary, no matter how large the portion of bone to be removed.

A perforation of the palate is often accompanied by destruction of the bones of the nose and flattening of the bridge. This, together with the harsh nasal voice and the penetrating fetid odor, makes the diagnosis possible by any one of the three senses, and from a considerable distance.

The local treatment of gumma of these soft tissues consists in cleanliness alone, and hydrogen dioxid is here of considerable value in destroying the foul odor.

The alleviation of the discomforts arising from a perforated palate lies within the realm of prosthesis rather than that of surgery. The loss of tissue is usually considerable, and the soft parts are so bound down and contracted by scar tissue that they are not suitable for plastic operation. As the result of several failures followed by a number of successes I have concluded that the simplest appliance is the most satisfactory, and that the elaborate soft-rubber instruments which attempt to imitate the motions and functions of the soft palate are too intricate to be used by the majority of patients, or to be made by the majority of dentists. Nothing has given me better success than the ordinary hard-rubber plate, sometimes extending some distance back on the soft palate, which enables the patient once more to speak with a human voice and to swallow without having food come out of the nose.

The description of Hutchinson's teeth, the permanent teeth in children of syphilitic heritage, I have not taken time to give because it is familiar to all of you, and the diagnosis is not difficult, except, perhaps, from the faulty enamel caused by exanthematous diseases occurring during the period of enamel formation.

It may not be out of place to speak of the attitude of some dentists who refuse to treat this class of cases on the ground that they are exposing their other patients to infection. They should consider that the organism causing syphilis is not highly resistant to germicides or

boiling, and that with simple precautions all danger may be avoided. Wear rubber gloves while at work on such cases, and when finished boil the gloves, napkins, and such instruments as will not be harmed by boiling, and soak the others in strong carbolic acid solution over night. These precautions are so easily taken that it must be on some other ground than that of solicitude for our patients that we refuse to help

a class to whom the dentist's care is so essential, in order that they may regain and insure their health by antisiphilitic treatment.

[After the conclusion of his paper the author gave an exhibition of models and appliances for correcting perforations of the palate; also a description of the history and characteristics of the *Treponema pallidum* and an exhibition of slides showing the syphilitic organism.]

PYORRHEA ALVEOLARIS.

By TIMOTHY LEARY, M.D., Roxbury, Mass.

(Read before the National Dental Association in general session, at its annual meeting, Boston, Mass., July 28, 1908.)

FEWER methods of treatment should be carefully applied in a large series of cases before definite conclusions are drawn as to their value. It is therefore my purpose to present at this time only a synopsis of the work which we are doing, and will continue to do, in the study of pyorrhea alveolaris.

The etiology of pyorrhea is hidden in obscurity, masked by general theories whose acceptance in great part by the dental profession has greatly interfered with the careful study along scientific lines of this really serious disease.

That the phenomena of pyorrhea are dependent upon infection is coming to be generally accepted. Whether infection arises only after the ground has been made ready through some diathetic influence must remain a question for the present. That infection is the dominant factor is evidenced by the transmission of the disease from husband to wife and by its tendency to occur in families. Our professor of clinical dentistry was associated in his student days with a dentist of the old school, whose custom it was to teach the young idea how to clean its teeth with pumice. He kept on his

stand a pot of pumice with an orange-wood stick. He would scrub the teeth thoroughly, and then declare "That's the way to do it," at the same time triumphantly pushing the stick back into the pumice to await the next victim. As a result of his methods, his clients shed their teeth at about forty years of age, and so proud were they of this family trait that a local caste of toothless families was developed locally. The ability to produce pyorrhea in animals, such as rabbits, is a further evidence in this direction.

The joint at the junction of tooth and gum is one of the poorest pieces of mechanism in the body. This joint is protected under ordinary use from injury; but if it be injured, a good opportunity for infection is offered. In animals, cases of spontaneous pyorrhea have been described in monkeys and in the cow. In each of these cases particles of insoluble food material appear to have been the agents in favoring infection, and it is possible that similar conditions obtain in human beings. At any rate, within a short time of the establishment of the process in pyorrhea, if not before, the

foreign body or irritant appears in the form of the so-called serumal calculus; a pocket once established, conditions are ideal for bacterial growth.

Many organisms in themselves incapable of infecting the animal body are enabled to bring about disease conditions when introduced into the tissues together with a foreign body, such as a sterile splinter of wood.

It is therefore conceivable that organisms which are not looked upon as infectious to man may play a part in producing pyorrhea.

Bacteriological examination of smears from the pus of pyorrhea furnishes little that is conclusive. Bacteria abound in the discharge, but known pathogenic organisms are marked by their inconstancy. One case will furnish staphylococci, the next streptococci, the next pneumococci, the next perhaps all three, and the next none of the micro-organisms mentioned. Cultures show a similar variation in the pathogenic flora.

An almost constant finding, however, in smears from a large series of cases was the fusiform bacillus-spirillum, which combination was first described by Vincent. This combination is responsible for the production of Vincent's angina, marked by the formation of a dirty gray pseudo-membrane in the throat, unassociated with marked general symptoms. Such a membrane tends to form in individuals whose resistance is low, and whose pharyngeal mucosa shows anything in the way of ulceration. In several instances the organism has been found in fetid abscesses about the mouth.

Noma, or spreading gangrene, which arises most commonly about the mouth in children who are extremely debilitated, has been shown to be due to this combination by Weaver and Tunnicliffe of Chicago, as well as others. The dreaded hospital gangrene of the pre-antiseptic period has also been demonstrated to have been due to this bacterium—for it has been shown to be a single pleomorphic bacterium. The history of this organism, then, is that of a non-pathogenic or mildly pathogenic bacterium normally present in the mouth, which under un-

usual conditions, *i.e.* lowered resistance of the individual, is capable of producing the mild disease, Vincent's angina, or, if the resistance be lowered to the vanishing-point, the serious disease noma.

Lowering of resistance is not, however, the only factor. Exaltation of virulence of the bacterium is apparently an important element, since noma tends to occur in epidemics, the organism from an ugly case being able to attack and kill relatively robust children who are exposed to it.

The changes which the organism produces, a spreading gangrene, suggest on an expanded scale the spreading proclivities of pyorrhea, which have given it the name of "phagedenic pericementitis." Pyorrhea occurs, however, in normal human beings, whose resistance to the spread of this disease is marked by an inflammatory exudate rich in leucocytes, in contrast to the limited serious discharge, if any, which is opposed to the spread of noma by its helpless infantile antagonist.

Goadby and others who have worked on the bacteriology of pyorrhea have noted the occurrence of organisms of the Vincent type. Goadby is inclined to look upon the lactic acid bacilli which are present in the mouths of milk-drinkers as the causal agent in pyorrhea. The absence of pyorrhea in children, notably milk-drinkers, and its occurrence in adults, many of whom drink minimal quantities of milk, if any, make his findings very questionable. The demonstration of the Metchnikoff school, that lactic acid bacteria are not only not infecting agents in man but are capable of replacing pathogenic organisms which thrive in their absence in the intestine, is also a strong argument against his hypothesis.

The fact that the spirochæta or spirillum is found with much constancy in the normal mouth, and the further fact that it is cultivable only on blood or serum media under conditions of strict anaerobiosis, may have been partly responsible for the overshadowing of this organism in previous studies by the other bacteria, better known and readily cul-

tivable in the air or ordinary media. The uniformity with which Vincent's bacterium occurred in smears from pyorrheal pus, not in small numbers but frequently predominating, led to a suspicion that it was an active factor in continuing the condition even if it did not play a part in initiating it.

Vincent has found that a combination of iodine, potassium iodide, and water, if applied in quantity to the lesions of Vincent's angina, brings about a rapid disappearance of the membrane.

We were therefore led to test its efficacy in the treatment of pyorrhea. The solution (iodine 1, potassium iodide 2, water 100) used in the laboratory in Gram's stain and also used in the sterilization of catgut, has remarkable penetrating properties, as shown in the use last referred to. It has also the advantage over other preparations of iodine, notably the tincture, of being comparatively non-irritant. It is essential, if results are to be obtained, that the pockets beneath the gums be first cleaned, and that any deposits of salts be thoroughly scaled away before the application of the solution. Moreover, it is necessary that the preparation be used frequently and in abundant quantity if we hope to keep the pockets clean.

Up to now we have daily treated a large series of cases with this preparation. The longest part of the process is the initial cleaning of the pockets of foreign bodies. After this has been done, the daily application of the IKI solution referred to requires but five to ten minutes. The results in uncomplicated cases of pyorrhea have been excellent, in that healing has been established in from two to four weeks of treatment.

It should, of course, be understood that we are not claiming priority in the use of iodine in the treatment of pyorrhea. Iodine has been used in this connection by the dental profession for many years, largely in the form of the tincture, usually applied at considerable intervals of time. The suggestion that iodine be used met with the response from our dental instructors that it had no value. Applied at least once daily, in the form

which we have used, the results have been satisfactory and prompt.

This prompt response has had an additional interest as indicating the possible relationship of the infecting agent in pyorrhea to the micro-organism of Vincent's angina. Infectious processes in which pyogenic organisms are the offending agents do not respond in this way to iodine, nor do processes in which infection plays no part. We therefore look on the rapid reaction of pyorrheal processes to iodine as a further evidence that some organism of relatively limited resistance is the active agent in this disease.

In "ugly" cases where the disease had persisted for long periods, or where the process was general, or the discharge was very abundant, cultures have shown that pathogenic bacteria were present, oftentimes in large quantities and apparently acting as secondary infecting agents. The Vincent organism is found in pathological conditions usually in association with other bacteria, often pyogens, and frequently with the diphtheria bacillus. In this class of cases we have therefore supplemented the treatment by bacterial vaccines according to the Wright method of inoculation. In most of our cases an autogenous vaccine from the pyorrheal pockets has been used. The organisms present were the streptococcus, pneumococcus, and staphylococcus, alone or in combination.

The combined treatment with IKI and vaccines has led to results perhaps more rapid in all cases than where the iodine was used alone. A small number of cases have been treated with vaccines alone, with very fair results.

Whether our results will have any permanence or not is a question which time alone can answer. The healing of retracted gums and the obliteration of pockets leaves a joint between gum and tooth less perfect even than it was originally. That such joints will remain free forever from infection is almost too much to expect. It is therefore improbable that we have established in any of our cases a permanent cure for pyorrhea. We have made more simple, we believe, its management, and ask further applica-

tion of the methods by the dental profession.

We have made no references to the pathology of the process, which needs careful study. Opportunities of obtaining specimens from jaws, including the cavity walls which extend toward the roots, are not abundant in this country.

It is hoped, however, that with a new source of supply material which has been recently opened, a detailed study of the pathology from autopsy specimens will be possible.

It is my expectation, with your permission, to report at later meetings the further results of our efforts.

CORRESPONDENCE.

SYPHILITIC REINFECTION IN SECONDARY STAGE (?).

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—A few days ago I received a reprint of a very able paper by Dr. Victor C. Pedersen, entitled "Syphilitic Manifestations in the Oral Cavity," etc., read before Section III of the N. D. A. at the Minneapolis meeting, and appearing in the DENTAL COSMOS for April 1908. In the discussion (see page 369) I note that Dr. Wm. Carr of New York makes the following statement (*italics mine*):

"Case of a young man of twenty-eight. . . . His mouth was more or less covered by mucous patches, and when I diagnosed his case he denied the very apparent fact. . . . *I also charged him not to bite his nails, etc.* . . . He returned the next morning and confessed that he had syphilis. . . . In due time

he came back to me with a beautiful chancre upon his thumb, due to the amputation of a hang-nail with his teeth."

Will someone kindly explain how, after the *secondary* symptoms were apparently manifest in the buccal cavity, the *initial* lesion made its appearance on the thumb? Also, how a syphilitic inoculated himself in the manner above described?—which I believe to be contrary to all present knowledge and teachings regarding this disease. As far as my knowledge extends, I usually caution these unfortunates against giving the disease to others, and have never found it necessary to warn them against infecting themselves.

Yours truly,

MAURICE GREEN, D.D.S.

NEW YORK, December 10, 1908.

PROCEEDINGS OF SOCIETIES.

NATIONAL DENTAL ASSOCIATION.

Twelfth Annual Meeting, Boston, Mass., July 28-31, 1908.

(Continued from vol. 1, p. 1392.)

SECTION II: Operative Dentistry, Nomenclature, Literature, Dental Education, and Allied Subjects.

Chairman—A. R. STARR, New York, N. Y.

Secretary—V. S. JONES, Bethlehem, Pa.

FIRST DAY—*Tuesday.*

THE first meeting of Section II was called to order Tuesday evening, July 28th, at 8.30 o'clock, by the chairman, Dr. A. R. Starr, New York, N. Y.

The first order of business was the reading of a paper by Dr. JOSEPH HEAD, Philadelphia, Pa., entitled "A Tartar Solvent Especially Useful in Pyorrhea Work."

[This paper is printed in full at page 41 of the present issue of the Cosmos.]

Discussion.

Dr. W. B. DUNNING, New York, N. Y. It is difficult to discuss a new proposition in any more than a speculative way, and when that proposition concerns a vital question in chemistry, the difficulty is still greater. A mathematician may reach, through pure deduction, an inevitable conclusion, but the student of organic chemistry works in a field in which the sources of error are not fully known, and where proof can only be arrived at through experiment. He must be prepared to find that two plus two may mean six or six hundred, or nothing, and Dr. Head in concluding his paper very properly impresses that point upon us.

Dr. Head; therefore, certainly has the advantage over most of us when he states that by careful experiment he has found that hydrogen ammonium fluorid will dissolve tartar, which is composed chiefly of calcium phosphate and carbonate, but will not affect the various structures of the teeth, all of which are composed of practically the same substances. There is no room for theoretical argument, if the complete proof of this paradox has been reached by practical means; but as the most painstaking work may be subject to technical error, it would be gratifying to know more specifically the various checks used by the essayist in excluding such possibility.

In the opening paragraph of his paper, Dr. Head makes a statement which in view of what follows leaves one somewhat in doubt as to its exact meaning. In speaking of his first experiment, he says that having placed a tooth covered with tartar in commercial hydrofluoric acid for a day, he "found it clean and white with neither enamel nor cementum in any way harmed, except that the remnants of the peridental membrane on the root had disappeared and the surface of the dentin was decalcified." I should like to ask if by this he means that the enamel and cementum were not

affected, but that some exposed surface of dentin suffered from the effect of the acid? This is a practical question, for a certain amount of exposed dentin may usually be found in the mouths of persons over thirty years of age, as the result of abrasion, and if any effect was noted on the surface of the dentin in the experiment mentioned, the question naturally arises whether, under prolonged treatment, a similar disintegration of other closely allied structures might not occur. I take it that the action of the hydrogen ammonium fluorid is similar to that of hydrofluoric acid in a lesser degree. Does the essayist mean that tooth-structures are but slightly attacked by the compound he recommends, so that the skilful operator may get rid of the tartar but prevent further action by deft manipulation? Or has he determined that prolonged applications have no effect upon the tooth? The escharotic action on surrounding soft tissues is of secondary importance, for that is readily seen and controlled by the operator, but an insidious action on any part of the tooth would be a serious drawback.

It would seem as though steel instruments must be badly affected by the liquid, either by direct contact or by the escape of vapor in the cabinet. Will Dr. Head speak more especially of the technique in handling this awkward compound which will attack almost anything but a wax bottle?

If all reasonable doubts have been removed, then we may congratulate ourselves upon having received a most valuable help in our most difficult work, and our gratitude to Dr. Head for his labors cannot well be expressed in words. This preparation should be put up by a reliable manufacturer, and should be examined and tried with all due precaution, so that whatever benefit may be derived from its use shall be widely known as soon as possible, for the highest instrumental skill in the removal of serumal calculus is inadequate in much of our pyorrhea work.

As to mixing this agent in a dentifrice, I think Dr. Head's qualification against

its use in mouths containing porcelain fillings and crowns is a sufficient objection to make such a preparation impracticable for general use. It would seem that its greatest value will be found to consist in removing tartar scales which are beyond the easy reach of our instruments.

Dr. A. H. MERRITT, New York, N. Y.
It is probable that there is no problem in the whole realm of dental practice which has so long baffled every effort at solution, nor one which is receiving more attention than the problem of pyorrhea alveolaris. But notwithstanding all the investigations which have been made along this line, and with the almost limitless amount of literature on the subject, there still exists a great diversity of opinion regarding its etiology and treatment. Men are everywhere—in the present as well as in the past—searching for the hidden causes of this most destructive disease.

Perhaps no better illustration of this could be found than that presented in the circular letter recently sent out by the Dental Society of the State of Louisiana. But whatever theory one may hold concerning its etiology and treatment, there is one feature in its treatment about which all are agreed, *i.e.* the necessity for the complete removal in every instance of all calcareous deposits upon the roots of the affected teeth, without which no other form of treatment will of itself avail anything.

If we consider the difficulty of accomplishing this by instrumentation in any case, the physical impossibility of complete removal in not a few instances, the necessity not only of complete removal, but of leaving the roots from which such concretions have been removed smooth and polished, the tediousness and the pain which to a greater or less extent are always attendant upon such treatment—it is not until we have considered all this that we are prepared to appreciate something of the value of the treatment outlined by Dr. Head. I venture to say that because of its almost universal applicability, it will prove to be the greatest forward step which has

ever been taken in the treatment of pyorrhea alveolaris. While I am not one of those who believe that the sole requisite for the successful treatment of this pathological condition is the thorough removal of the deposits from the roots of the affected teeth, I nevertheless believe that there is no one factor more important in its treatment, nor one which, independent of any other, will be attended with such universally satisfactory results.

I regret that I am not able to throw some light on the chemical anomaly which is here presented. It only lends additional emphasis to the fact that in biology it is never wise to leave Nature out of consideration, and that in the field of physiological chemistry she refuses to be interpreted in the simple formulæ of inorganic chemistry.

The possibility of a dentifrice which by judicious use will not only keep the mouth clean in the ordinary sense of that word, but will coincidentally keep the teeth free from deposits of tartar, is a most attractive one—one which, if realized, will be a great advance toward that dental millenium—preventive dentistry.

The value of Dr. Head's discovery cannot be overestimated, and with it he has only added to the obligation which the dental profession owes to him. With it he has conferred a great boon upon suffering humanity, and anyone aiding in its emancipation from the ravages of this destructive disease must be regarded as a public benefactor.

For the sake of clearness I wish Dr. Head would, in closing the discussion, explain a little more of the detail of his technique in the use of this solvent; whether he depends upon it solely for the removal of the deposits or whether he uses it in connection with scalers; whether it acts with equal facility in all cases, or whether he finds it necessary to make several applications in some instances.

Dr. EDWARD C. KIRK, Philadelphia, Pa. The subject, I need scarcely say, is new to me, as it doubtless is to all of us, at least as far as the application of this composition is concerned. I use

the term composition advisedly, because I am skeptical as to its being a chemical compound at all. I do not understand by what method of reasoning it is possible to make such a compound as the essayist designates as hydrogen ammonium fluorid. At least according to the teachings of chemistry that I have had, I do not think that such a compound is chemically possible.

Dr. HEAD. How about hydrogen ammonium bifluorid?

Dr. KIRK. That also I do not think is possible.

Dr. HEAD. The text-books speak of it, anyhow.

Dr. KIRK. I speak only from memory, but as I now remember it hydrofluoric acid is what is called a monobasic acid, and the preparation, as I understand it from the method of making it, as given by the essayist, is a mixture of ammonium fluorid with an additional quantity of hydrofluoric acid. This mixture has been known in the arts for many years, and has been used in the glass-etching industry to produce that particular physical result which Dr. Head has produced in his experiment on the glass tumbler, that is, to give to glass a frosted appearance. Where pure hydrofluoric acid is used in a liquid form for etching on glass, it produces a vitreous lustrous surface; it dissolves the glass, but the etched surface does not have the frosted opaque appearance. In order to obtain the frosted surface it has been the custom to add a certain amount of ammonia, which has been found to produce that result, and, as I understand it, that is practically the preparation that Dr. Head has brought before us. But what is new and extremely interesting is the point which he makes with reference to what we may call the selective affinity of this mixture for tartar as apart from tooth-structure. In view of Dr. Head's experiments and observations it seems that this is perfectly possible and highly probable, with a reasonable doubt in my mind that at least makes me want to test the matter for myself. I am somewhat of a doubting Thomas, and I think it just as well for several

people to test a suggestion of this sort as one. But I do raise a question as to the propriety of using in connection with the soft tissues of the mouth a preparation which is so closely allied to hydrofluoric acid, and especially of using it indiscriminately. It should in my judgment be used with extreme care, because we all know the very disagreeable results that follow the application of free hydrofluoric acid to soft tissues, because of its peculiar and intensely escharotic effect. I have been interested in the reports from the dental profession coming in from day to day of disastrous consequences that happen from the careless use of hydrofluoric acid since it has come into use so generally with the growth of our interest in porcelain work. It is known among those workers in glass and enamels who use hydrofluoric acid that the burns produced are extremely painful, producing a hardening and destructive effect upon the cuticle and subjacent tissues, often causing great deformity of the finger-ends when the acid gets under the nails of glass etchers. From the theoretical point of view I do want to raise a note of warning, or at least a word of caution, as to the general use of this mixture, which is so closely allied to hydrofluoric acid, before several observers have tested the matter out thoroughly. I think we are all indebted to Dr. Head for the report of his suggestive experiments tending to show that this material, this mixture of ammonium fluorid and hydrofluoric acid, whatever it may be chemically, has a selective action which enables it to dissolve tartar without having a corrosive effect upon the enamel or dentin of the tooth. I agree with the last speaker that it does seem to be not only a chemical but a physical anomaly that we can use a substance, a solvent, which has the power to dissolve porcelain, and is so closely allied to hydrofluoric acid and yet is without danger to the soft tissues.

Dr. W. M. DAILEY, New York, N. Y. As the gentlemen who have preceded me have gone into the subject of the chemistry connected with the new compound that Dr. Head has brought before the

profession, it seems hardly necessary for me to take up that side of the subject. If Dr. Head has discovered a new chemical compound by which we shall be able to dissolve the calcific deposits on teeth, I feel that we shall be highly benefited by his discovery; but the fact remains that, following certain experiments with hydrofluoric acid which Dr. Head has brought before us in his paper, I found that a fifty per cent. solution in which teeth were immersed for thirty-six hours, and also a twenty-five per cent. solution applied for the same time, produced no destruction of the calcific deposits on the roots, but there was a decalcification of the enamel. I therefore present these tests, and leave the subject for your consideration.

Dr. HEAD (closing the discussion). I shall take up the remarks in their order, and if I leave any question unanswered I hope that I shall be reminded of it. I do not pretend to be able to answer all of them, but I think that I can make some of the questions that have been brought out tonight a little clearer.

Concerning the decalcification of the dentin that Dr. Dunning spoke of, I found that the tissue was decalcified because the tooth had been split and dropped into the solution. When I used teeth that were ordinarily sound, I found that the enamel and the cementum were not hurt at all. Incidentally, I cannot understand what Dr. Dailey used—or else he must have had some teeth whose structure was different from that of the teeth with which I experimented. I speak only on the basis of about one hundred or one hundred and fifty experiments, in which the teeth were immersed in the solution, allowed to dry, and kept for a week or two weeks. I cannot, of course, object to Dr. Dailey's experiments, because they speak for themselves. I only have to say that I would be glad to have you all try this compound, and if it be true that it will do what I have stated, you will find it out, and if it will not do this, you will find it out also.

Dr. Dunning also asked how this preparation is used. You can apply it with steel instruments, and it hardly seems

to affect steel more than would water. The method of using it is very simple and I have waited for over a year before I presented this to the profession. I have always believed that the only means of curing pyorrhea is the absolute removal of the tartar and a subsequent packing of the pocket with quinin or with anything else that will keep it aseptic. It has been my experience that in these conditions the quinin acts as a stimulant on the gum tissue and causes it to re-adhere to the tooth. Now, however, I do this: Where the pocket has been formed and there is tartar in the pocket, I apply hydrogen ammonium fluorid under the gum, and after about two minutes I tell the patient to wash his mouth. When he comes the following day the tartar is so soft that it can be readily removed. I do not understand why such a small quantity in the mouth should have such a thorough effect—there is a great deal about it that I do not understand. One thing I do know, that it will dissolve these microscopic bits of tartar, and cause the gums to re-adhere by healthy stimulation.

I recall one case of particular interest that I should like to cite: A patient came with a loose upper central incisor, and on examination of the pocket with an instrument there appeared to be a lump of tartar at the tip of the root. Heretofore I have considered such cases practically hopeless, but as the patient was anxious for me to make an attempt to save the tooth, I first cleaned out the root-canal, and finding a clear passage through the canal to the pocket, I filled the root-canal full of the fluid and taking a piece of rubber forced it through the canal into the pocket. I did that about twice a week. There was considerable irritation, of course, but not so much that the patient could not readily bear it. The condition of the tooth seemed to improve, and the patient was encouraged to such an extent that against my own better judgment I was persuaded to continue this treatment, until this summer, about a month ago, when the patient was about to leave me, I had

reason to suspect that there might be trouble at the tip of the root. I therefore had an X-ray picture made, and found under this central incisor an impacted canine tooth that was doing its best to push its way through. I do not know whether the tooth will finally be saved, but I do know that the patient and all her family are very much pleased with the progress the tooth has made toward recovery, and instead of my hopelessness I am beginning to feel that the tooth will be saved. I have in many instances injected this compound into pockets, and have used it for a long time, and I have had one or two burns where it was allowed to get on the gum tissue and to remain there until it dried. The gums should always be wiped clean of any excess. But by following the directions described in the paper I have not had any trouble, and I can only say that if any of you will inject this solution around the tooth, and keep it there for two minutes, having first protected the gum margins, you will have no trouble from burns if the patient rinses his mouth inside of two minutes. I do not for a moment think that this medicine can be used in a haphazard way in the mouth, but I would strongly recommend its proper use.

Dr. DUNNING. With regard to the effect of this solution on dentin, did I understand you to say that the dentin was somewhat affected?

Dr. HEAD. There was no question about its not having an effect upon dentin, but this was in the case of the tooth that had been split and in which the dentin was exposed. It seemed to have somewhat the same effect on the dentin that sulfuric acid would have. However, when the dentin is protected this preparation has the advantage of not affecting the enamel or cementum at all.

With regard to that very interesting question raised by Dr. Merritt concerning a mouth-wash, I perfectly appreciate that in the present state of our art it will not be very valuable, but I cannot help looking forward to the time when with proper attention to the care of children's teeth, the teeth will not be full

of porcelain, and there will be no artificial dentures or bridges in the mouth, but tartar, even then, I think, will be with us. I am looking forward to that time, hoping that we may then have an effective method of combating our one remaining enemy.

Now, I take great pleasure in speaking of Dr. Kirk's objections. When Dr. Kirk speaks on the subject of chemistry we take off our hats, but I cannot in this instance understand Dr. Kirk's statement that hydrofluoric acid is a mono-basic acid. I have looked up hydrofluoric acid very carefully, and while I do not know the complete chemistry of it, I think if Dr. Kirk will look up Remsen he will find that under the head of hydrofluoric acid Remsen speaks of two great classifications of the salts of hydrofluoric acid—the hydrogen and the basic salts—and as further proof I have at my office the bifluorid of potassium and the bifluorid of sodium made by Baeder, Adamson & Co. In fact I have used the bifluorid of potassium in experiments along this same line, and it has somewhat the same effect as the solution I speak of, except that it is not so effective. And so I cannot understand Dr. Kirk's statement with regard to these salts, because for the first time in my experience I find Dr. Kirk differing with Remsen.

Concerning the dangers of hydrofluoric acid, nobody knows them any better than do I—an old porcelain worker. I dropped a little on my finger the other day, which I felt for a week; the spot is still on the finger-nail. I should not advise the use of hydrofluoric acid in the mouth—at least I would not allow it to be used in mine. I appreciate the great danger connected with the use of this solution if it contains uncontrolled hydrofluoric acid, but when this solution of ammonium fluorid is used properly I think it is harmless, and I do not think that the burns from it are any more harmful than the burns from carbolic acid, and burns will never occur if the gum is wiped free from the excess. As stated before, I have injected it into blind abscesses and have used it in other ways, and I have great confi-

dence in it, but why it should be harmless in the tissues of pyorrhea pockets and on the outside burn the mucous membrane I do not understand; as I said, there are a great many things about it that I do not understand, but in spite of Dr. Dailey's experiments I am still convinced that it will dissolve tartar and not dissolve enamel or cementum, which can be easily proved by experiment. I do not know what it was that Dr. Dailey used, whether it was sulfuric acid or what, but I am convinced from my experiments that Dr. Dailey's solutions were impure.

A MEMBER. Do you find that free hydrofluoric acid is liberated after the preparation is kept for a time?

Dr. HEAD. I have not found it so. I have been using it for a year, and with the one or two exceptions of burns that I have spoken of, I have had nothing but good results.

The next order of business was the reading of a paper by Dr. W. L. FICKES, Pittsburg, Pa., entitled, "A Few Principles in Relation to Colors, and Their Application to Porcelain Inlay Work."

[This paper was printed in full in the November issue of the *Cosmos*, vol. 1, p. 1179.]

Discussion.

Dr. J. Q. BYRAM, Indianapolis, Ind. I dislike to begin my remarks by complimenting the essayist, but I cannot help sincerely congratulating him upon this paper. I have contended for a number of years that if we are to do porcelain work in an artistic manner we must familiarize ourselves with some of the basic principles of the physics of light. One of the causes of discouragement in porcelain work has been the difficulty in obtaining the proper colors, and it is my belief that this difficulty arises largely because the operator does not comprehend the first principles of color formation. We must bear in mind that color is a sensation, and that it is produced by light coming in contact with pigments; that a certain amount of this light is absorbed, reflected, transmitted, diffused, or re-

fracted, and that owing to these various phenomena we have the various hues of color. We are asked, Why should this knowledge help us in porcelain work? Unless we are able to comprehend just what effect light will have upon the inlay, it is really hard to tell just what to do. I believe that the essayist knows more about the physics of color than any dentist with whom I have come in contact. He has studied this subject for a number of years, and he has given to us tonight a paper which shows that he has gone into his subject in a scientific manner. It is therefore very hard for me to discuss this paper, because the essayist has stated facts, and when facts are stated it is very hard to start a discussion that does not agree with them.

I have made a few notes, however, and care to speak only of a few points. If we are to do porcelain work, we must learn something about colors. It has been my experience that most of us do not comprehend just what colors are in teeth. When we look at a tooth, we really do not know what conditions actually exist; we take our shade guide and porcelains and then try to mix a few colors and have them come out so as to imitate the tooth, and if they do not, we are discouraged. My method of constructing inlays differs just a little from the one given by the essayist. While I do build inlays in layers, if you please to term it so—I prefer to call it building them in sections—it has been my experience that it is almost impossible to build inlays in layers in the sense that we speak of, one layer over another, and bring out the colors. It is a physical impossibility to build one color over the other and have the strength of these colors so divided that one will not affect the other. In other words, if I take two pieces of colored glass—for instance red and blue—the inference is that if I hold them so that the light may be transmitted I ought to obtain a violet color; but the color will not be violet. The strength of the pigment in the red will absorb the blue so that there will be a modified red. Instead of building inlays in layers, that is, starting with one color and placing another over it to

bring out the proper color, I prefer to make them in sections, so that the colors will blend into each other.

The essayist speaks of the low-fusing pigments. While I am still a high-fusing porcelain advocate, I am frank in saying that I now use more low-fusing porcelain than I did a number of years ago. If in either case the porcelain is overfused, the color is thereby affected. If any porcelain is properly fused there is, I believe, no advantage in the method that the essayist mentions.

There is one other point to which I should like to call your attention in the construction of inlays, and which the essayist did not mention. In the construction of the inlay, the foundation should be coarser than the enamel. If I am using low-fusing porcelain, I apply a specially ground porcelain which is coarse. This porcelain is applied and fired to only a high biscuit, and then the enamel is placed over this and properly fused. When the light is transmitted through the enamel to this coarser porcelain, it is diffused or broken in such a manner that when it strikes the cement there is less change of color. As the light passes through the dense enamel to the coarser porcelain, it is refracted or broken, and more of it is really absorbed, and in that way there is less of it to be reflected from the cement. I never fire the foundation to a glaze, leaving it as nearly as possible in a condition of hard biscuit.

There is no question that inlays are affected by artificial light. If we go into the physics of color, we can readily see why this is true. I dare say there is not one present who has not experienced difficulty in matching colors of porcelain or other articles in artificial light.

I agree with the essayist that the fewer cements we use the better. I have contended for a number of years that all approximo-incisal inlays should be set with white cement. It is simply a question of physics; white reflects, and colors absorb light. If we have a cement that will reflect and not absorb light, there will be far less change of color than when the light is partially absorbed and then

reflected. The principle is different in small inlays on the labial surfaces. Take as an illustration the labial surface of a central incisor, and use a cement which imitates that section of the tooth; the cement and the porcelain are almost of the same color, and consequently there is practically no absorption of the light-rays, because that which has been transmitted through the porcelain is reflected. I have done inlay work for many years, and I am frank to admit that I am not successful enough to make two or three mixtures of cements and have the color cements come out as I want them. For this reason I prefer to work with white cement, and thereby have the least possible amount of color change.

Dr. CHALMERS J. LYONS, Jackson, Mich. It is certainly a great pleasure for me to assist in the discussion of this most excellent paper. Knowing the essayist as I do, I feel that the ideas that he has presented to you are not fanciful dreams, but the results of scientific study and experimental research covering a long period of time. The porcelain operators of today owe to Dr. W. L. Fickes a debt of gratitude for the work he has accomplished and given to the profession along the line of color problems in porcelain.

He has pointed out that in order to comprehend and apply the principles of colors in porcelain work the fundamental principles of light have to be reckoned with.

The relation of color to light is much the same as that of music to sound; color has its many hues, its long scales of tints and shades, its true and false chords. Mere sound gives us little pleasure; if developed, however, to its highest form—music—it thrills.

In the same way with light, our enjoyment culminates at the glories of color in a flower, or of a sunset, or of some of Nature's paintings.

The harmonies of light have not been as thoroughly studied and classified by scientists as those of sound. If they had been, the porcelain operator would have less difficulty in imitating the different tones of color in the natural teeth. The

essayist well says that the ability to imitate the various hues and tones of color of a tooth depends as much upon our susceptibility to the various gradations of color as upon our skill in the manipulation of the materials.

It is a well-known fact that there are some individuals with such perfect organs of hearing that they are able to distinguish the slightest sounds, who are yet so utterly unable to distinguish between two tones or between the harmonies and discords of music that they are said to have "no ear." In the same way there are those whose eyes are well formed for seeing all distant objects, but who are unable to distinguish between the hues and tones of color, and may be said to have no eye for color.

To successfully comprehend and apply colors in porcelain, one must first have an eye for color. Then the eye can be developed to distinguish the finer hues and tones only by close application to the work, and by observation and scientific study of colors.

I quite agree with the essayist when he says that the operator need not fail in obtaining the proper colors on account of the chemical change taking place in the pigments during the fusing of the porcelain. There is more danger of failure in bringing out the proper tone of color in the process of fusing the porcelain by not obtaining the proper surface gloss, than there is in chemical decomposition of the pigments taking place. If the surface gloss of the porcelain inlay is not the same as that of the natural tooth, then the reflection of light will be different and the appearance changed.

If the inlay be underfused the required reflection of light will be lacking. If the inlay be overfused and a glossy surface be produced, the reflection of light will be too great, and the inlay in either case will not match the tooth in tone of color, even though all the pigments are preserved in normal condition in the porcelain and in the right relation for that particular case.

Regarding building the porcelain enamel up in layers in inlay work, I doubt not that the layer method is the

best for the porcelain operator who has had long experience and who has made the study of colors and of color combinations a part of his daily work, but to the man with a limited experience in color combining, it seems to be too indefinite for practical application in porcelain work.

As the essayist says, every layer of body in succession is influenced by the underlying layers, and the degree of modification in color is principally dependent upon the thickness of each successive layer, the degree of translucency, hue, and tone of color, and intensity of colors.

He says these are all guides to final results. So they are to the scientific colorist, to one who has had long experience in combining colors either in chromatic art or ceramic art, whose experience may signify to him just what tone of color a definite enamel color applied in a definite thickness of layer will bring out if applied in a certain position in the inlay over another layer already applied and partially fused. To the novice, however, or to the porcelain operator with a limited experience, these things are necessarily indefinite, and in building up in layers the thickness of the layer and the intensity of tone of color of that layer is necessarily guesswork to a greater or less degree, and the final results are many times disagreeably surprising.

It is my opinion that for the beginner in porcelain work, or for the porcelain operator who has not had the opportunity to make a scientific study of colors and color combining, the method of building up the inlay in sections will be the most satisfactory and the most successful. This is accomplished by building in with the foundation body that part of the inlay which is to represent the dentin and firing it to a high biscuit; then the gingival third of the inlay is built in with the tone of color of the gingival third of the tooth, then the middle third, then the incisal third—the layers, however, should not overlap each other. The inlay is completed with a uniform color.

While in a measure this method may be considered a layer method, yet on account of the enamel layers not overlapping each other, the influence upon the tone of the color produced by those underlying layers is not as great as in the layer method introduced by Dr. Reeves, whereby one enamel layer overlaps the other.

It is true that under different illumination the inlay will appear differently as far as the color is concerned, and as the essayist says, it is possible to produce an inlay which will exactly imitate the hues and tones of the color of the natural tooth only under certain definite conditions. The position of the inlay in the tooth with reference to the source of light must always be taken into consideration before attempting to build up the inlay with the colors. An inlay on the distal surface should usually be made lighter in tone of color than one on the mesial surface, for the inlay on the mesial surface receives the rays of light less obstructedly than the one on the distal surface.

Regarding the modifications in color of the inlay after cementing to place, I have found that if the inlay is so constructed that the light cannot penetrate to the cement unchanged, the color is not so greatly modified.

The dentin of a natural tooth under a high-power glass has the appearance of having a rough surface. I have found that the more nearly that rough surface can be imitated with the foundation body which is to represent the dentin, the less the color of the inlay will be modified by the cement.

The reason for this is that the rays of light are broken up at the junction of the foundation body with the enamel or at the rough surface, and instead of the rays of light passing straight through to the cement, we have a diffusion of light, and instead of all of the light being refracted, reflected, and absorbed, a part at least is diffused in the same way as in the normal natural tooth.

I accomplish the preservation of this rough surface on the foundation body in one of two ways—*i.e.* either by using

a Consolidated body for the foundation, firing to a high biscuit and not at any time thereafter fusing, and using Brewster or S. S. W. body for my enamel colors, or by leaving the foundation body rough, by roughening the surface after the surplus water has been absorbed, then firing to a hard biscuit and at no time overfusing the foundation body, and by fusing the enamel to complete the inlay.

I have been able to get splendid results with these methods of procedure in applying the foundation body, and I firmly believe that the nearer we can imitate the appearance of the normal dentin with the foundation body, the nearer we can come to procuring the color of the natural tooth with our inlays.

Dr. JOSEPH HEAD, Philadelphia. Dr. Byram has covered the subject so thoroughly that he has left little for me to say. I only wish to remark that this subject is of intense interest to me, and has been most scientifically and carefully gone into by the essayist. He has refreshed our minds on many things that have come to us in porcelain work, and has also added much new and valuable material. There is one question, however, that I should like to ask. He mentioned that in pure white light a certain effect is produced, and I wish he would explain what he means by pure white light. The point is this: Heretofore I have considered white to be composed of all the colors; it is practically a surface reflecting equally the three primary colors. One always slightly predominates or is reflected from the surrounding objects. The ordinary white colors that we use in porcelain are yellowish white and bluish white. The nearest approach to white is white with as little adjacent reflected color as possible. It has been my experience with yellow that it is a brightener, and that to a certain extent it takes the place of light. You will notice that artists in painting a picture, when they want an intense light will put on a touch of clear yellow. It has been my experience with fillings in the posterior surface of a tooth where there is a shadow, that yellow ce-

ment will cause a brightening which to a certain extent counteracts the shadow.

Dr. BYRAM. Will you explain what you mean by the term shadow?

Dr. HEAD. Shadow, as I understand it, is where the light is shut off by any substance whatever. It is the absence of light; that is, I think, the scientific meaning of the word shadow. It has been my experience that shadow is more in the nature of a gray. Yellow will more readily counteract gray than anything else. The question of the shadow is something that I think none of us have any difficulty in understanding when we are backing a tooth.

Dr. BYRAM. That is not shadow; that is reflection, which is altogether different from shadow.

Dr. HEAD. Don't you think that the coming through of the substance has something to do with it? Is not the luminosity taken away?

Dr. BYRAM. That does not necessarily make a shadow. As I understand it, shadow is the exclusion of light.

Dr. HEAD. It does not mean the same thing, but a similar thing. Is not lack of reflection, lack of light, therefore in the nature of shadow? Suppose you take an ordinary natural tooth, and break the corner off. There you have the same substance, and still, if you cement that broken piece on and turn the corner away from the light so that the light is shut off by that line of cement, you have a shadow.

Dr. BYRAM. That is exclusion of light. I cannot see that that is a shadow.

Dr. HEAD. What is a shadow, then?

Dr. BYRAM. I do not know.

Dr. HEAD. I think it is the exclusion of light. If not, I should be glad if you would tell me what it is. There is another point to be discussed with regard to layers. I have not been as successful in making small porcelain fillings in layers as some others. Some can take a pinhead filling and make it in three layers, and get just the proper differentiation of colors from this porcelain and cement, but I need a good-sized filling before I can make it in layers.

I believe what the essayist says in regard to the use of pure colors. The point is that if we make inlays in layers, we mix the two colors, so that they will come out as pure colors side by side, which gives us a light effect that is very satisfactory. My experience is that when two porcelains are put together there is not a sharp line between the colors but a blending, and sometimes I have made inlays in this way in which you could not tell whether they were made in layers or not. It looks as though it were one color, and that is very apt to be a different color from what you want. My experience is that I can better secure the desired colors by taking two colors and working them side by side.

Dr. C. H. LAND, Detroit, Mich. All this light problem is too theoretical. In the first place, talking about light, what is light? In one sense, it is a species of vibration. It has not so much to do with the color problem as we talk about. All I want are four foundation colors in porcelain work, and I shall mix and blend them in such a way as to get twenty shades and tints, and put them in any place desired. It is common knowledge that all tooth manufacturers blend colors, and we find two or three colors in every tooth which they make. That is not new. Light brought from the back of the tooth forward is reflected light. Light thrown on yellow is absorbed light, and that is why yellows do not give any trouble. The whole trouble is simply that you cannot secure enough depth for the porcelain in an inlay in an approximal or labial cavity, and any substance that is opaque or in which the light is reflected from particles that are not translucent will throw back their opaque shadows and thus interfere with the translucency of the colors. The trouble is that we are talking too much about colors and lights. I do not want more than four basic colors to get the correct color of the majority of teeth used, and the ones that trouble you most are the light-colored porcelains. I used inlays for two years, until I found the trouble, and then I almost entirely abandoned them, because it was utterly impossible

to get translucency in any porcelain of thin layers. If you have yellow teeth and use a small amount of cement, you will not be troubled with the so-called theoretical color problem; there are no problems connected with them. I have been handling porcelain for forty years and have not found that trouble, nor do the dental manufacturers find any difficulty. With the colors employed by them you do not find any trouble in matching teeth, do you?

Dr. BYRAM. We certainly do.

Dr. LAND. You do not have a great deal of trouble. If you do, I am sorry for the manufacturers and for the rest of the profession, and I do not believe that any of you could accomplish any more than the dental manufacturers have in manipulating colors. These papers are scientific, but what do we want with all this verbose theory of light in ordinary porcelain work? I do not need it. I am not ashamed to say so, and I am not afraid to demonstrate my statements by practical tests. What we want is depth or translucency when we work with porcelain. Throw your inlays aside, and when you learn to cap teeth over the natural roots so that you will have depth and translucency, you will have no more color problems, nor any more cavities to bother you. I am talking from facts. First, I will prove that it is impossible to make a thin piece of porcelain of any description show the proper color when it is cemented in, or when a piece of metal is put back of it. It is just the same as tobacco stain coming through and discoloring teeth on the lingual side. What you want is translucency. That is, whenever a vitreous compound is fused to that point where you can see through it, as in the natural teeth, then you have imitated nature. It may be a yellow tooth or a tooth with a yellow tint; it may be a dark grayish looking tooth or a stained tooth. The teeth of a person who chews cloves, for instance, are stained through and through, and also in people using tobacco, the color of the teeth is ruined in that way.

The reflection of light is largely due

to uneven surfaces. We do not see the transparency of the diamond or the translucency of agate before the rough surface is reduced to a perfect plane.

One of the gentlemen refers to a state of biscuit in teeth. Does he know what a biscuit tooth is?

Dr. BYRAM. I think I do.

Dr. LAND. Will you give us the definition?

Dr. BYRAM. Porcelain fired to the point of shrinkage and not glazed.

Dr. LAND. Then it is not thoroughly vitrified?

Dr. BYRAM. No, sir.

Dr. LAND. We call teeth biscuit when there is nothing but the paste in them. The real question of utility is answered by the state of vitrification more or less, and the term biscuit should not be used. If I take a vitreous mass, porcelain, china, or common clay, and raise the temperature sufficiently, I can impart to it a transparent glaze so that you can see the other side of it, but the less thoroughly vitrified the mass is, the more closely I approach porcelain; when it is fired to a biscuit merely, it is opaque; in this mass that you speak of you have a surface through which you can filter water, and until you put the glaze on china you have a fired biscuit.

It is a fact that the most perfect porcelain in the world is the dental porcelain. We have three hundred variations of vitreous masses that are called porcelain, but the scientific pottery men only recognize three, the German, the English, and the French, calling the others semi-porcelains or china. The name porcelain means a translucent piece of pottery. None of these are called porcelain when they are in a state of partial vitrification, or biscuit. We have the truest porcelain in dentistry, because when we bring it to that state of vitrification in which it is translucent we rightly call it porcelain, and not before. This is what we find in the natural teeth. If we put the electric light back of them, we find a translucent mass. Teeth are not like pottery, because as soon as we reach the natural state of translucency we have developed the ideal mass. Loss

of color, opacity, and a frail mass is found when it comes to low-fusing porcelain, because we have added potassium or sodium to reduce the fusing-point, and the more of that we put in, the farther away we get from true porcelain. The pigments are destroyed by flux, and the true porcelains are those that contain the least amount of artificial flux. In my investigations of porcelain I have realized that the dental porcelains have more right to the name of porcelain than any other vitreous mass in the world, and our high-grade artificial teeth represent that high-class porcelain. The high pigments, such as titanium and platinum pigments, are put in these and are not affected by low firing and are used to the best advantage in them.

I do not believe that it is necessary to say any more on this subject. I have done porcelain inlay and contour work for twenty-three years, and I feel sure that I am the originator, for no one else has ever claimed this title. I have almost abandoned inlay work because of the difficulty of preventing the cement from transmitting its opacity through the porcelain. You want sufficient body, and sufficient depth, and when you have these you have strength and natural appearance; if you then use a minimum amount of cement, your shadow difficulties will be overcome.

Dr. BYRAM. No one admires Dr. Land more than I, and I believe that no one has given him more credit for what he has done in porcelain work than I, yet it has grieved me to hear a veteran of the profession say before a scientific body that this thing and that thing is nonsense. Are we to be scientific dentists or mere tooth-carpenters? Now, Dr. Land in his discussion shows that he realizes the principles of light. Yet he assures us it is nonsense, and spends fifteen minutes in telling us how certain factors will act in porcelain work, which is just what we have been trying to have the profession realize. Dr. Land does not realize that he has been experimenting for twenty-three years and has learned by sore experience. His failures have taught him these principles, and

yet he claims that these principles are of no account. I admire Dr. Land, but I believe that such discussions as his should not be permitted to go into the proceedings of a scientific body.

Dr. FICKES (closing the discussion). I think Dr. Byram said that he has never had any trouble with low-fusing porcelains except in the fusing of them.

Dr. BYRAM. I said if I could get the porcelain properly fused.

Dr. FICKES. That you did not have any trouble with the color. The difficulty encountered in properly fusing is the principal reason why the low-fusing pigments cause constant trouble. They change color more readily than do the high-fusing pigments, by being either oxidized or reduced. To obtain a greater variety of colors, many pigments are used in coloring porcelains which are unnecessary, and which are of disadvantage because of their liability to decomposition, or to mutual chemical action when mixed.

I do not find anything to criticize in the remarks of Dr. Byram. We do not agree entirely, however. I do not understand how coarsely ground porcelain would have the effect that he says it would have. The smoothness or roughness of the surface of a body has more to do with its color manifestations than have any other of its physical characteristics. If the roughness is on the cavo-surface of an inlay, it would have much less influence in controlling the local color than it would have if it were on the outer surface.

Dr. Head asked what I meant by white light. Solar light is usually called white light, although that is not strictly true, because it is not constant but continually changing. When light-waves of a single wave-length act on the eye, a color sensation is produced which corresponds to a definite position on the normal spectrum. When waves of all possible lengths act on the eye at the same time, a sensation of white is produced. Solar light is usually made up largely of white light. That is, the waves are of all possible lengths, which act on the eye simultaneously, thus producing a sensation of

white, which modifies the color sensations from other waves. A pure color is entirely free from white light, and it is said to be impure if a proportion of white light is mixed with it. This can be illustrated by the effect of sunlight on colored tile. When the tile is not highly illuminated, the local color is to be seen, but if the sun is shining brightly, and the angle of incidence is near the perpendicular, none of the local color can be seen. The colored rays from the tile are mixed with the white light from the sun, and the result is a tint of the color which approaches pure white. The greater the proportion of white light, the less pronounced is the hue of the color. We observe this same effect on a porcelain inlay. If you throw a very bright white light on a porcelain inlay, no matter how intense or pure the color is, it will make that porcelain appear so light that you will think it is almost white.

I believe that Dr. Head practically bakes in what we generally call layers, although he does not call it so. I do not like the term layers, because we really place the colors in patches, so that their combined effect produces the color desired.

I have the highest respect for Dr. Land's work, of which I have frequently had occasion to speak; but I was very sorry to hear him make such statements in regard to light and color. I agree with him on many points in practical porcelain technique, but when he speaks of light and color, he either does not understand the nomenclature or else he is entirely wrong. I only stated principles in my paper, and then tried to interpret these principles in their application to porcelain work. Dr. Land questions the truth of these principles, as well as my interpretation of them. He freely interchanges terms which are antonyms rather than synonyms, which shows that he does not use the words properly; it would therefore be useless for me to try to answer him.

In regard to the meaning of the word shadow, I would say it is a very misleading word when used in connection with inlay work. I have here an instru-

ment with which I suppose you are all familiar. There are two crystals of tourmaline in these tongs. If you turn them so that the optical axes are parallel you can see through them, but if you cross them the light is entirely cut off, and they appear opaque. This is an illustration of polarization by absorption. The light is doubly refracted by each plate; one of the two sets of waves is absorbed, and only that set of waves whose vibrations are parallel to the optical axis is transmitted. When the plates are crossed the light transmitted by the one is absorbed by the other, and the light is cut off, although each plate is transparent. I do not mean to say that we have this effect in inlays. We do have shadows, but the opacity of the materials is not the only reason for the changes in color; there are other influences which have as much to do with the changes of hue and tone as has the cutting off of the light, and, as illustrated by the tourmaline tongs, the absorption of the light or shadow does not necessarily mean that it is caused by the opacity of the materials.

Dr. LAND. I wish to say that any words which I may have used in an extemporaneous way that sounded impolite or wrong, I am willing to correct. I have the utmost respect for this scientific paper, and I did not wish to be understood otherwise. I maintain, however, that it was translucency that I meant in one instance of my remarks, and not transparency.

Dr. FICKES. I did not mean to convey the idea that I objected to Dr. Land's remarks. I will say, however, that nearly everything he said in regard to light is opposed to the well-known laws of light, and for that reason I do not believe that his ideas were expressed by the words he used. He said that light had nothing to do with color. Any scientist knows that light has everything to do with color.

Dr. LAND. Can light change color?

Dr. FICKES. It certainly can.

Dr. LAND. It can be reflected in different ways, but it does not change the color.

Dr. FICKES. A change in the source of light, a change in the surrounding conditions such as would modify the light reflected from other objects, and many other changes of light will modify the color. We may say that color is light, because without light there is no color. The physical and chemical structure of the object affects the light, and that which is emitted from its surface to the eye affects the optic nerve and the retina, and produces the sensation of color. If this does not mean that light has everything to do with color I do not know what it does mean.

Dr. Byram is on a committee on nomenclature, I believe, and I would suggest that he use his influence to teach the proper use of the words shade and color. They are used as synonyms, but they should not be so used. So-called "shade guides" might be more properly called color guides. People usually mean color when they speak of shade.

Dr. DUNNING. I think we are all interested in the result of the proposed tests which Dr. Head has consented to make on freshly extracted teeth to determine the value of the compound which he advocated in his paper for dissolving tartar, and I therefore move that a committee of three, including Dr. Dailey, be appointed to confer with Dr. Head for that purpose.

The motion was carried, and the chair appointed the following committee: Drs. W. B. Dunning, A. H. Merritt, and W. M. Dailey.

On motion Section II then adjourned until a later session.

THURSDAY—*Second Session.*

Section II was called to order Thursday afternoon at 3.30 o'clock by the president, Dr. Carr.

The first order of business was the report of the committee appointed to make experiments with hydrofluoric acid, as advocated in Dr. Head's paper, previously read before the section, and in

accordance with Dr. Head's and Dr. Dailey's experiments, as follows:

REPORT.

Experiment No. 1. The best teeth obtainable on such short notice were old, dry, decayed teeth, covered with hard lumps of calcic deposits. These were dropped in the following solutions: (a) Pure hydrofluoric acid. (b) Fifty per cent. of hydrofluoric acid diluted with water. (c) Twenty-five per cent. of hydrofluoric acid, diluted with water.

After allowing them to remain in these solutions for six hours at an ordinary temperature, the teeth were removed, dried, and examined. The calcic deposits on all specimens had softened, some particles falling away, other particles remaining in position, all being of a cheese-like consistence, removable by the finger-nail. Much of the pericementum had been removed, though some shreds remained. The enamel and cementum, as far as the naked eye could detect, were unchanged.

Experiment No. 2. One freshly extracted tooth, the occlusal surface of which was much worn so that a considerable amount of dentin was exposed, the root of which was covered with a heavy calcic deposit, and the enamel of which was highly polished, was placed in Dr. Head's solution of hydrogen ammonium fluorid and left for six hours, then removed and dried. Upon examination the tartar was found to be still in position, but of cheese-like consistence. The exposed dentin was somewhat disintegrated. The enamel and cementum, as far as the naked eye could detect, were unchanged.

With regard to Dr. Head's representation concerning the action of hydrogen ammonium fluorid, the committee is unanimously of the opinion that it is correct.

With reference to experiment No. 1, your committee would further report that the findings were at variance with the experiments made by Dr. Dailey; and as, with Dr. Dailey's specimens, the deposits remained hard after thirty-six hours of immersion, we are forced to the inference that the solution used by him was other than pure diluted hydrofluoric acid.

Respectfully submitted,

WM. B. DUNNING,

Chairman.

ARTHUR H. MERRITT.

Dr. JOSEPH HEAD, Philadelphia, Pa. During the discussion of my paper yesterday, Dr. Kirk made the statement that

he was convinced that the solution that I used is a mechanical mixture of hydrofluoric acid and ammonia; he claimed this to be the case because, as he said, hydrofluoric acid was a monobasic acid, and therefore it was impossible that there should be a bifluorid salt. I have here an extract from Remsen's Chemistry on the subject that will be of interest in this connection (Remsen, fifth edition, 1907, page 179):

Constitution of hydrofluoric acid and the fluorids.—Hydrofluoric acid forms two series of salts, corresponding to the two general formulas MHF_2 and M_2F_2 or MF . The former, of which the salt KFH_2 is an example, are called acid fluorids, the latter simply fluorids. The fluorids are commonly represented by the simpler general formula MF , though it appears probable that the doubled formula is correct. It will be seen later that fluorin forms a large number of so-called double salts or double fluorids, which it is difficult to explain in any other way than that they are derived from the acid H_2F_2 . Thus cryolite, to which reference has been made, is called a double fluorid of aluminum and sodium, and is generally expressed by the formula $\text{AlF}_3 \cdot 3\text{NaF}$, which means simply that in some way aluminum fluorid is combined with three molecules of sodium fluorid; but it is difficult to see how this union can be effected without assuming that fluorin has a greater valence than one.

Now, the difference of opinion is not a difference of opinion between myself and Dr. Kirk, but between Dr. Kirk and Remsen, and I cannot help feeling that Remsen has somewhat the better of it, since all over the country at the present time manufacturers are manufacturing and selling these bifluorid salts.

The next order of business was the reading of a paper by Dr. G. W. WELD, New York, N. Y., entitled "Characteristics of Calcified Tissues in Two Complete Sets of Human Teeth Free from Caries," as follows:

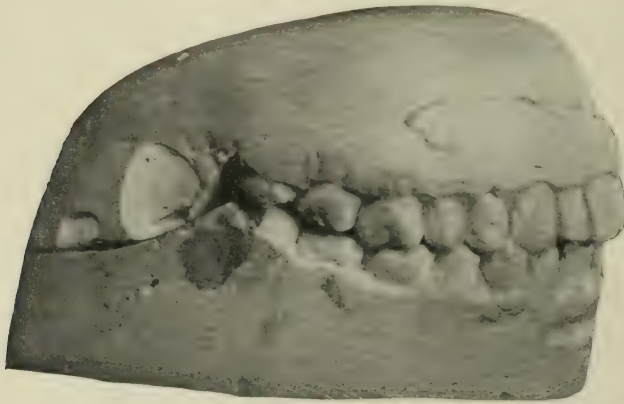
CHARACTERISTICS OF CALCIFIED TISSUES IN TWO COMPLETE SETS OF HUMAN TEETH FREE FROM CARIES.

Whatever practical or scientific thought may be contained in this paper is partly

due to the author's reading of what others have accomplished. I appear before you in the guise of an opportunist, for there is but little merit or distinction in presenting the casts of two human sets of teeth to this association, even though the originals be free from caries. They have cost me but little time and labor; they form an interesting exhibit, as they suggest problems of susceptibility on the one hand and immunity from caries on the other, and as perhaps some instructive conclusions may be drawn from them.

excepting for periodical attacks of headache. His temperament is of the nervo-sanguine type. He has never required the services of a dentist, excepting once in two or three years, when accumulations of tartar were removed and the teeth were polished. He has never paid any particular attention to oral hygiene, uses a tooth-brush once a day, but no tooth-washes, unless *aqua pura*, and whiskey he considers in that class. He keeps late hours, smokes and chews tobacco, drinks all kinds of alcoholic spirits,

FIG. 1.



Case I. "Hard teeth." Showing upper and lower jaws in occlusion, with slight malocclusion of the anterior teeth.

I wish to say at the outset, however, that I find myself somewhat inclined to be empirical in some things, and perhaps iconoclastic in others, although it will be my endeavor to build up, rather than to tear down.

HISTORY OF THE TWO CASES.

The plaster casts, as you will observe, represent two phenomenal sets of human teeth, both differing in appearance and apparently in structure, very similar and yet very dissimilar in many respects. I shall give their individual histories as briefly and succinctly as possible.

Case I.—The person under observation is a saloonkeeper, single, of Irish descent, fifty-two years of age, with no specific history. He has never been ill,

and sometimes to excess. Nevertheless, he has in his mouth today thirty-two sound teeth, not one of them being in the slightest degree affected by caries. There are no fissures to be found in his teeth large enough to admit the introduction of the finest point of an excavator or apparently to afford a dwelling-place for any colony of bacteria. His saliva is generally neutral, although it shows an acid reaction at times, but free from mucus. The only blemish upon this set of teeth, as you will observe, is a slight mechanical abrasion on the edges of the buccal surface of the lower molars.

From a close observation of these teeth in relation to their physical characteristics, there would seem to be every indication that they represent what the practical dentist would call "hard teeth;"

i.e. there is presumably a preponderance of the calcium phosphate or perhaps it may be said, more perfect calcification. For fifty-two years, or at least since the eruption of the permanent teeth, they

FIG. 2.

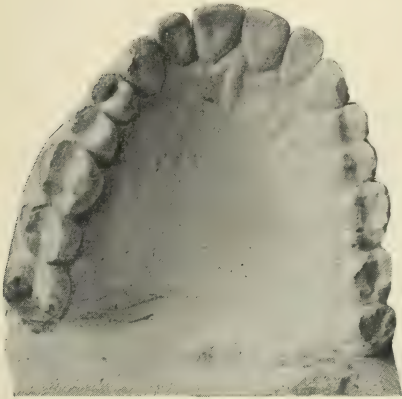
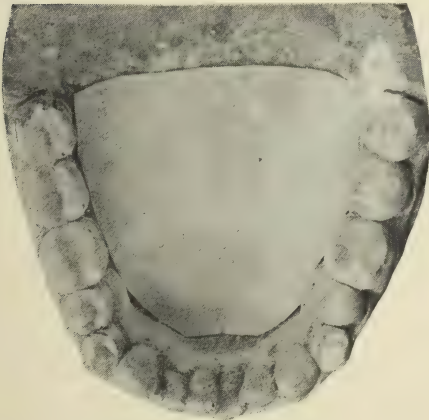


FIG. 3.

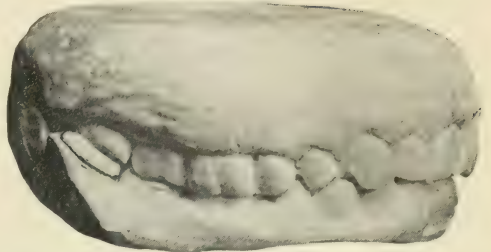


Case I. Showing occluding surfaces of the upper and lower jaws.

have been immune from the attacks of the acid-producing bacteria.

Case II.—The person under observation is an American actor, married, forty-one years of age, with no specific history. He has generally enjoyed good health, but has been occasionally afflicted with rheumatism. His profession has called him into different parts of the

FIG. 4.



Case II. "Soft teeth." Showing upper and lower jaws in occlusion.

FIG. 5.

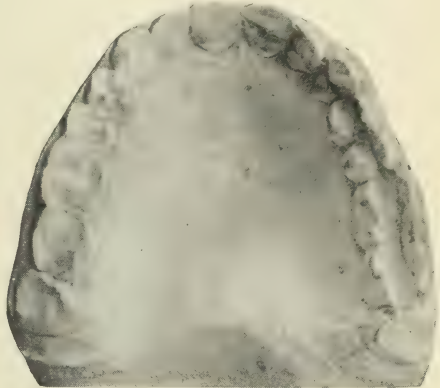
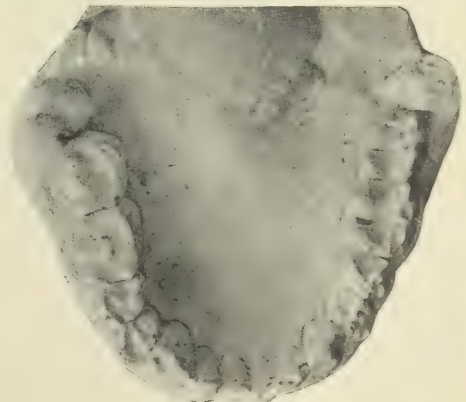


FIG. 6.



Case II. Showing occluding surfaces of the upper and lower jaws, with chemical erosion.

world, with of course different climatic conditions; his temperament is of the nervo-sanguine type; he has never re-

quired the services of a dentist, except for an occasional polishing and beautifying of the front teeth. In fact, in this case as well as in the first case, there has never been any great accumulation of tartar, and of course not the slightest indication of any calcic inflammation of the pericementum; his saliva is continually acid, with an absence of mucus. He has paid but little attention to oral hygiene, has brushed his teeth in a perfunctory sort of way once a day, but to no great extent has he made use of dentifrices. He is a typical man about town, and I might say, about the world; he smokes and drinks in moderation. He has in his mouth thirty-two sound teeth, sound at least as far as caries is concerned. Observation, however, reveals that they are affected by chemical erosion. This is well marked in both jaws, from the third molars behind to the median line in front; some of the teeth have been worn down almost to the "quick," and yet up to the present time, he has never suffered any inconvenience.*

For a period of forty-one years, or since the eruption of the permanent set, his teeth have been immune from caries. All indications in this case would seem to point to what the practical dentist would call "soft teeth"—that is, a presumable preponderance of the calcium carbonate, or calcification less dense than in case I.

PROBABLE COMPOSITION.

There is more or less speculation regarding the composition and textural strength of these two different sets of teeth, for of course no chemical analysis showing the percentage of calcium salts they contain has ever been made. But the practical dentist with an educated and delicate touch requires no analysis of such teeth. Instrumentation tells him that in the one case he is operating upon

teeth so dense in structure that when the cavities which they contain have been properly excavated and filled, they will be preserved for many years. In the other case he recognizes a soft structure, and his experience teaches him that to pursue the same line of treatment as in the former case would be a mistake, and that he would be doing an injustice to his patient.

The practical carpenter requires no microscope to tell him the difference in structural strength between a piece of pine wood and a piece of *lignum vitæ*.

The blacksmith requires no polariscope to tell him the difference between soft iron and steel; the hammer and cold-chisel is all that is necessary.

The practical miner has no use for an apochromatic lens to determine the textural strength of the different rocks that he examines.

The so-called empirical dentist is satisfied that he is living a life of usefulness, and although he is unrecognized as a scientific thinker and his methods may differ from those of his so-called scientific brother, he nevertheless conscientiously believes that he saves many teeth.

The theory has been advanced by one or two dentists that in Case II, that of the actor, the result might be due to the stress of occlusal contact from a habit of gritting the teeth during the excitement of gesticulation and excessive grimaces in the rôle of a tragedian, thus leaving it to be inferred that the loss of tooth-substance resulted from mechanical attrition rather than from chemical erosion. But the occlusal aspect of the case, the exact locking of the articulation, and the apparent movement of the mandible would seem to preclude such a supposition.

Aside from the apparent difference in the physical characteristics or in calcification with immunity from caries in these two cases, they seem to bear out with a surprising and beautiful confirmation that can hardly be gainsaid at least two of Dr. Black's conclusions—*i.e.* first, that the "differences in density or in percentage of lime salts in the teeth have

* Case II is borrowed from Dr. B. W. Smith, 127 W. 48th st., New York, who has kindly permitted the writer to use the same in this paper.

no influence as to their liability to decay," and second, "there is no basis for the supposition that calcic inflammation of the peridental membrane or phagedenic pericementitis (so-called 'pyorrhea') attacks persons who have dense teeth in preference to those whose teeth are less dense."

I shall have occasion to speak of Dr. Black's conclusions later.

EXPERIMENTAL STUDIES IN THE LABORATORY.

Let us take up one or two points relating to the minute anatomy and the composition and the possible arrangement of the calcium salts in the enamel of the human teeth. In doing so, I trust you will pardon my speaking of a few experimental studies of my own, made a number of years ago, which seem to bear upon the subject. I allude to them, not that they may prove of very much importance *per se*, but because they will aid me in leading up to what I wish to say and to the conclusions likely to follow.

Doubtless some of you will recall the discussions and the views held at one time by Dr. Karl Heitzman and Dr. Boedecker concerning the presence of organic matter in the enamel. They believed that the enamel contains organic matter in the form of enamel fibers, which passes between the enamel rods and sends branches into both interprismatic substance and prisms. These views were opposed by Dr. Williams and other dental scientists.

At that time I was a student of microscopy in the laboratory of Dr. Heitzman. I think that one or two who are present here tonight were members of that class. At any rate, I recall the names of Atkinson, Abbott, Boedecker, and Starr, who were members. The class was organized for the exclusive study of the minute anatomy of tooth-structure. One evening, after Dr. Heitzman had demonstrated the interprismatic spaces and isolation of the enamel rods, I asked permission to make a similar demonstration myself. The technique employed at that time for the decalcification of the

hard tissues was to embed in paraffin and immerse in a weak solution of chromic acid, if I am not mistaken, and to allow it to stand for a month or two; a thin section was then cut off by the microtome and carefully transferred to the microscopic slide. It was then found that a greater portion of the intermediate cement substance had been dissolved by the action of the acid, and that the enamel rods were more or less isolated.

For my own experiment and demonstration I had previously prepared a very thin section of dry enamel. Placing this section upon a slide, under a cover-glass, and arranging the proper focus—the magnifying power was about five hundred diameters—I painted over the section by the aid of blotting paper and capillary attraction a six per cent. solution of acetic acid. In one minute's time the interprismatic substance was completely dissolved, and the current of acid flowing over the thin section had made up a heap of the enamel rods, which presented the appearance of a bunch of sticks. This is a pretty experiment, and one that can be observed by the eye from start to finish. Dr. Heitzman was gratified because, as he remarked, it changed the technique from the rate of a stage-coach to that of a limited express.

By a mere coincidence, I discovered at that time that a six per cent. solution of acetic acid would dissolve pulverized calcium carbonate, without having any immediate effect, at least, on calcium phosphate. The query was raised at the time whether or not, after all, the interprismatic substance might not be composed of the calcium carbonate, and the enamel prisms of the calcium phosphate. We know that in some geological formations we find a crystalline rock consisting of granite, feldspar, and mica, arranged in planes, so that it breaks easily into coarse slabs, and sometimes cemented together with a rocky material, perhaps calcium carbonate, less dense. Be that as it may, it is evident that the resisting powers of the interprismatic substance and the enamel prisms against

the action of acids correspond in degree to that of calcium carbonate and calcium phosphate respectively.

If we could only devote a little more time to scientific researches, doubtless many mooted questions would be made clear.

I sometimes think, in this connection, that the greatest mystery in this world, outside the composition of the enamel of the human teeth, is the extreme brevity of human life; for oftentimes, when a discovery is made which promises to be of great benefit to mankind, when the efforts of the scientist have been crowned with success, and he is about to receive the thanks of his friends and fellowmen, he is suddenly called away—like the great scientist, W. D. Miller. As the French say, *Il a parti sans adresse*.

We who are members of the dental profession today have one consolation at least, and that is, that the ranks are being filled up with young men, some of whom are college graduates, and all of whom have educational and social advantages which eminently qualify them to take up the unfinished investigations which others lay down and leave behind.

The experiments referred to have slept peacefully for over a quarter of a century. I have often thought, however, that they were entitled to further confirmation by continued experimentation. Recently, through the courtesy of Dr. J. Bethune Stein and the facilities afforded in the Histological Department of the New York College of Dentistry, I have been prompted to take up the subject once more, and to try and ascertain, if possible, if there be any regular arrangement or distribution of the calcium salts in the enamel, and whether any new light could be thrown upon that much-mooted question, *i.e.* is there any *uncalcified* tissue in the human enamel of the adult?

It would appear almost conclusive that if a six per cent. solution of acetic acid dissolves the interprismatic substance under a microscopic lens without affecting the enamel rods, and if the same acid dissolves calcium carbonate in

a test tube without chemically affecting the calcium phosphate under similar conditions, a regular arrangement of the calcium salts in the enamel should follow, *i.e.* the rods should be found to be composed of the calcium phosphate and the interprismatic substance of the calcium carbonate. But I regret that I have not had sufficient time to finish these experiments, the character of which, as you must see, is microscopical, chemical, and histological; much more time and study will be required to complete them. Some of the chemical tests, especially, are extremely fine.

I am obliged, therefore, to defer this part of the subject to some future time, and to change my course somewhat by digressing and touching upon other matters bearing upon the subject to some extent, which may prove interesting, if not instructive.

CORRESPONDING ACID RESULTS IN THE ORAL CAVITY.

Before digressing, I wish to say that from a weak solution of a vegetable acid in the laboratory, which destroys enamel structure, it is only one short step to the oral cavity, where an organic acid accomplishes the same thing, in both cases the objective point for attack being the weakest point in the structure, namely, the calcified tissue between the enamel rods. Obviously only two things remain to be done to remedy this condition of affairs: First, to work on the defensive, improving the nutritional state of the calcifying tissue during the period of tooth-formation, which should enhance the textural strength of the teeth and retard the activity of the bacterial causes of decay—in other words, to fortify the interior, and to render the position impregnable. In the second place, by assuming the offensive, outside the breastworks, we can exterminate the common enemy with some subtle poison.

It is a very easy thing to criticize and tear down, but it is much more difficult and praiseworthy to originate and build up. I admire the latter class of work,

and have little respect for the former. But there are exceptions to all rules. In this case I have great respect for the micro-organisms that are continually "tearing down." They have proved the best friends the dentist ever had, or ever will have. These kind, invisible little creatures who have labored for us so silently and incessantly, through daylight and darkness, heat and cold, for so many years, deserve a slight tribute. To deprive them of the means of daily nutriment or to reduce them to a state of starvation would be a most reprehensible thing to do, for in turn it would deprive thousands of men and women of their means of support! Scientists may succeed in exterminating them, but if that day ever comes—and I pray that it never will!—then, as far as the dental profession is concerned, emulation will sleep, ambition will die, there will be starvation in the ranks, and the wailing and gnashing of teeth will resound throughout the world!

EXPERIMENTAL STUDIES RELATING TO BACTERIA.

Let me briefly call attention to a few other experiments that I became interested in a few years ago, which perhaps may at first appear to be outside the limits of the dental profession, for they mostly concern bacteriology and the medical practitioner. I refer to experiments relating to the inhibitory influence of oxygen upon the growth and development of the tubercle bacilli. Let me say just here that the application may be found in the different localities occupied by the different bacteria—those on the one hand which destroy lung tissue, and on the other those that destroy tooth-structure, both being apparently beyond the reach of medicinal agents.

The experiments which I refer to embrace four different series, the first in the laboratory of Kings College, London, under the supervision of Professor Crookshank, the second in the laboratory of the College of Physicians and Surgeons in New York city, under the supervision of Professor Prudden, the third in

Loomis' laboratory, under the direction of the late Professor Loomis, and finally a series of experiments among the dispensary patients in the outdoor department of the Bellevue Hospital.

I will not weary you with the details of the technique employed in these experimental studies, suffice it to say that it was found that an excess of warm oxygen upon growing cultures of tubercle bacilli inhibits their growth and development. These studies, as I have observed, were continued in the dispensary, and a record of some sixty odd cases of patients afflicted with pulmonary tuberculosis was recorded. The hygienic condition of the patients was watched and improved as much as was possible, which I am free to confess, after my experience with dispensary practice, amounted to very little, at least in a majority of cases. Particular attention, however, was paid to the digestive tract during their course of systemic treatment, which was chiefly dietary, with the ingestion of one or more of the various preparations of iron, the object being to increase the number of red blood corpuscles and furnish more oxygen to the lung tissues. It was found that if the hemoglobin of the blood be increased even to a small degree and a corresponding increase be brought about in the percentage of red blood corpuscles, the patient becomes stronger, and that both subjective and objective symptoms are improved. I think it is the consensus of medical opinion today that any germicide that may be introduced into the human system which is powerful enough to kill the tubercle bacilli in the lungs will injure, if not destroy, the corpuscles of the blood; and by comparison it may be said that any germicide introduced into the oral cavity powerful enough to destroy the micro-organisms in the teeth will injure, if not destroy, the surrounding tissues.

You ask me, "Is there no hope, then, for consumptives?" No more hope, in my opinion, so far as medical agents are concerned, than there is of saving the human teeth by antiseptic tooth-washes.

While speaking on this subject, I

should mention that the decrease in the death-rate in New York city* from pulmonary tuberculosis per 1000 inhabitants since 1881, has been from 4.2 to 2.21 (in 1904), a reduction of almost fifty per cent.

This low death-rate, however, is ascribed by the Department of Health to the general improvement of the sanitary condition of the city, to the precautions that are widely observed by the consumptives, to the disinfection of the premises vacated by consumptives, and to the removal of "open" cases to hospitals. It is now the prevailing fashion for physicians to send their patients away to the country, and yet the increased knowledge relating to climatology has played but a small part in the compilation of the above statistics.

There is no doubt that a large majority of patients suffering from tuberculosis will live much longer, if they do not entirely recover, in a climate such as the Adirondack Mountains, the western coast of Florida, or in Southern California, than in climates such as we find in Boston, New York, or London.

But one thing must be borne in mind, namely, that when a beneficial climate is found, the patient must remain there, for a return to the climate in which the disease was contracted, at least without the advice of the attending physician, usually results in a relapse and a fatal ending.

Two important questions that will probably be discussed by the medical congress that meets in Washington next September will be the segregation of consumptives and the tuberculin test.

The point that I wish to emphasize, however, and which is likely to be of interest to the dentist in this connection, is, in my belief, that pathogenic micro-organisms after having once established a lodgment in the tissues are impregnable to any medicinal agent or antiseptic, and that when they are overcome and eradicated,

such action is entirely due to the vital processes of resistance within the body, or to the self-limitation of the micro-organism, it having a limited medium in which to develop. Neither the lungs nor the teeth possess this limited condition.*

It would seem reasonable to conclude, therefore, that manual dexterity or skillful instrumentation, with good judgment in selecting proper filling materials, will do more for the salvation of teeth in the future—as has been the case in the past—by preventing the bacterial causes of decay, than an ocean of antiseptics, or an encyclopedia relating to the supposed germicidal or pathogenic influence of the saliva. When I review the wonderful improvements that have been made in dentistry during the past thirty years, my sense of pride wells up in thinking of the names of the mechanicians whose inventions have proved so useful and practicable; and when I recall the improved filling materials, the application of electricity, the ingenious and complicated mechanical devices in orthodontia, I feel inclined, for all practical uses, to cast my vote for the plodding constructive master-mechanic, in preference to the scientific and theoretical dentist.

DR. BLACK'S CONCLUSIONS.

Those of you who have followed Dr. Black in his scientific investigations relating to the "Physical Characteristics of the Human Teeth in Relation to Their Diseases," will recall that he says that the "differences in density or in percentage of lime salts in the teeth are not the controlling factors in the strength of the teeth, nor their hardness; this seeming to depend upon the condition of the organic matrix. . . . The active cause of caries is a thing apart from the teeth themselves, acting upon them from

* Cf. circular, "Information Regarding the Measures Adopted by the Board of Health for the Sanitary Supervision of Tuberculosis in the City of New York," 1905.

* It has been claimed that carbolic acid dressings kill the tubercle bacilli in the tissues; others claim that leucocytes do so. It is admitted that quinin kills the germs of malaria, and that the continuation of the disease is due to reinfection.

without; and from a consideration of the facts thus far developed, the logical inference is that the cause of the differences in the liability of individuals to caries of the teeth is something in the constitution, operating through the oral fluids, and acting upon the active cause of caries, hindering or intensifying the effects.

"Imperfections of the teeth, such as pits, fissures, rough or uneven surfaces, any bad forms of interproximal contact, are all causes of caries only in the sense of giving opportunity for the action of the causes that induce caries. . . ."

"There is no basis," Dr. Black goes on to say, "for the treatment of pregnant women with a view of furnishing lime-salts to prevent the softening of their teeth, or with a view to producing better calcified teeth in their offspring.

"With our present knowledge, the only basis for the selection and adaptation of filling materials to classes of cases is the individual operator's judgment as to which he can so manipulate as to make the most perfect filling, considering the circumstances, his own skill, and the durability of the materials."

With some of these conclusions I am in perfect accord. In fact, the models of the cases which you have seen this evening bear upon and confirm at least two or three of Dr. Black's brilliant deductions.

But when any dentist who stands for reform and scientific methods affirms that "Caries of the teeth is not dependent upon any condition of the teeth, but upon conditions of their environment," or when it is said that "there is no basis for the supposition that some teeth are too soft or too poorly calcified to bear filling with gold, or with other metals in use for that purpose, since all are found to be abundantly strong," and that there is "no basis for the selection and adaptation of filling material to soft teeth, hard teeth, frail teeth (in structure), or poorly calcified teeth," I can only say that such a dictum is beyond my comprehension, and interferes with my conception of what is a reasonable conclusion after thirty-

five years of observation and practical experience in the art of filling and preserving the human teeth. I have seen not only one case, but I think I can safely say that I have seen a hundred cases of "soft teeth" that have been filled with gold, which in a short time have decayed around the fillings; and I have seen the same thing occur in similar teeth which I have filled myself. I venture to say that there are living today hundreds of practical dentists who know practically nothing concerning the scientific causes of caries, but who have preserved thousands of teeth and who will bear me out in this statement.

I stand upon an empirical platform, in perfect accord with some of the scientific conclusions that are recorded, but equally opposed to others. From that much criticized platform I am prompted to ask my scientific friends how they account for the great vitality and pronounced immunity from caries in these two cases which are on exhibition? I have been informed by one dentist that it was "environment," or the absence of forces acting from without; by another that it was the "constitution," or the presence of protective forces acting from within; possibly it might be the latter, for none of us know what the aggregate of the vital powers of a human being may be.

I have seen a poor woman upon her deathbed, apparently, weighing scarcely more than fifty pounds, with a pulse that was imperceptible and a flickering breath so feeble that hardly a particle of moisture could be observed upon a looking-glass; and yet two years after, I have seen the same woman doing a hard day's work, weighing one hundred and twenty pounds, with apparently every organ in her body sound. On the other hand, I have seen in the Rocky Mountains, 9000 feet above the level of the sea, a magnificent specimen of physical manhood attacked with mountain fever. I have watched that man grow weaker day by day, and weaker still; and all the tonics and stimulants and therapeutic agents in the state could not have saved his life.

Tell me, ye men of science, how do you account for this great difference in the vitality of two human beings? On the one hand we have the living skeleton who defies and conquers disease, on the other hand, the autocrat, the all-powerful, who succumbs at the first attack.

You aver that it is the presence of the phagocytes; you say it is constitution, heredity, vital force.

Let me say, gentlemen, that whatever that spark of life may be, or wherever it may be—*sabe Dios*.

Discussion.

Dr. I. N. BROOMELL, Philadelphia. I am very glad indeed to take some part in the discussion of this paper, especially because I do not agree with all the features which the paper contains.

I do not agree with the essayist when he says that he is inclined to be empirical, because I believe that he has felt that this term applies to him because of his disposition to talk common sense, which he may feel is antagonistic to scientific speculation and scientific facts.

Science and common sense are not usually placed in the same class, but after all there is but little difference between them. I have little faith in any scientific principle which does not have some practical application, which most of them have.

Can it be possible that the scientific knowledge which most of us possess in regard to the evolution and growth of the teeth has no practical application? Can it be truthfully said that an understanding of the histologic characteristics of the hard dental tissues is of no practical value? Now, we have this knowledge, but do not make practical use of it.

I never hear the treatment of pyorrhea alveolaris discussed without feeling pity for the delicate fibrous elements which are torn asunder through instrumentation, and am convinced that if the knowledge which we have regarding the histology of these parts were more practically applied the result would be very different.

The essayist exhibits photographs of two complete sets of teeth which he says "differ in appearance and apparently in structure," and the question seems to arise whether there is any marked difference in the structure of human teeth? Here again common sense coupled with scientific knowledge supplies the answer, *i.e.* that there is a difference. We might just as well make the claim that all other similar tissues of the body are chemically identical. Take, for example, some other epithelial product, say the hair, in which there is a great variety in texture. Is not this the result of a variation in its chemical constituents?

Take the nails, the hardness of which varies in different individuals, and at different periods in the same individual. Is it not right to say that this is the result of a variation in the chemical constituents of the nails? No one will deny this, yet there are men who claim that the teeth, although just as intimately connected with the body as the hair and nails, and developed and nourished very much in the same way, do not vary in the same way, that is, do not vary in hardness.

I believe this to be incorrect. On the contrary I believe that not only do the teeth of different individuals vary in their proportionate chemical constituents, resulting in harder or softer structure, but also that this same variation exists in the teeth of the same individual at different periods.

I cannot agree with the essayist when he asserts that the abrasion present in case No. II is the result of "soft teeth." While these teeth may be softer than those in case No. I, these deductions cannot be positively drawn, from the fact that their occlusal surfaces are abraded. On the other hand, experience seems to teach that teeth thus abraded are usually hard in texture and on this account frequently immune from caries, as is shown in the case exhibited.

There being no further business before it, Section II adjourned *sine die*.

**SECTION III: Oral Surgery, Anatomy, Physiology, Histology,
Pathology, Etiology, Hygiene, Prophylaxis, Materia
Medica, and Allied Subjects.**

Chairman—D. J. McMILLEN, Kansas City, Mo.
Secretary—F. E. COBB, Minneapolis, Minn.

FIRST DAY—Wednesday.

THE first meeting of Section III was called to order by the chairman, Dr. D. J. McMillen, Kansas City, Mo., at 3 o'clock Wednesday afternoon, July 29, 1908.

The first order of business was the reading of a paper by Dr. A. H. MERRITT, New York, N. Y., entitled "The Protective Substances of the Blood in Their Relation to Pyorrhea Alveolaris."

[This paper is printed in full at page 44 of the present issue of the *COSMOS*.]

Discussion.

WM. R. WILLIAMS, M.D., New York, N. Y. Dr. Merritt's paper has interested me greatly. It shows a concern for the recent scientific work in medicine and a discontent with the present limitations of our treatment that are very stimulating. I do not quite know at what point to take up the discussion. What he said was so well thought out and so accurately expresses the results of the latest work along these lines that I would not challenge or criticize his words. Perhaps, however, some of you, busy with work in your own special field of healing, have not found much leisure to devote to the literature of other departments of medicine, and therefore you might be interested to hear more of what is being done in connection with treatment by means of vaccines.

Vaccination for the prevention of infection has been used successfully in the case of several important diseases, notably bubonic plague, cholera, typhoid fever, and most important of all, small-pox, the disease in which it won its first and greatest triumph. Dr. Merritt, how-

ever, speaks of quite another phase of the subject, namely, of the use of vaccines for the purpose of effecting a cure in persons who are already the victims of an infection. This use of vaccines has been studied carefully during recent years only, and is yet largely undeveloped.

While the existence of such substances as opsonins is generally admitted, there is some skepticism among bacteriologists as to the reliability and value of Wright's methods of measuring the opsonic power of the body fluids. The method is rather complicated and tedious, and requires an exquisite technique. These difficulties, of course, militate strongly against the adoption of this guide to the use of vaccines. Whatever the final valuation of Wright's hypotheses and methods may be, we are forced to admit that he and his pupils in working with these methods have obtained results in the treatment of certain conditions of disease that have surpassed the results of all of their predecessors.

The treatment with vaccines does not seem equally applicable to all types of infection. It gives promise of the greatest success against those lesions that are rather sharply limited to small and somewhat discrete portions of the body. In its relation to these diseases the human body is very like the body politic in its attitude to foci of political disease and corruption. As an example of this one may cite the conditions of government that exist in so many of our cities. We know that these evils exist and we realize that they are undesirable, but we get along tolerably well in spite of them, and therefore put up with them and pay the cost of it all with complaisance. If all of the units of the political body could but be aroused to activity, and a con-

certed attack be made upon the disease, it could easily be overcome and eradicated. Thus it is with our physical bodies also. Bacteria may lodge and thrive here and there, and may cause a certain amount of damage to the organism, but without stirring up its protective forces to an adequate degree. In consequence of this lethargy the invading organism persists in its noxious activities, and the host sacrifices more or less of its tissues to the slow advances of the disease. There are, however, forces dormant in the cells of the body that are able to overwhelm and exterminate the parasitic invader and to restore health to the organism. To awaken these latent functions intelligently and effectively is the aim of vaccine therapy.

A familiar instance of such a segregated disease is the group of suppurative infections of the skin due to the pyogenic staphylococci. Furunculosis and the ordinary acne are members of this group. You know how boils may crop out, one after another, for a period of many weeks, and how the acne pustules continue to recur in certain persons for years. Heretofore all sorts of disturbances have been blamed for this condition, and physicians, unable to achieve brilliant success in the treatment of the acne itself, have accused their patients of being constipated or of having indigestion, uterine disease, anemia, or general debility. If the patient could successfully vindicate himself from all of these charges, the physician could only fall back to that impregnable fortress, diathesis, and say, "Well, you have an oily skin." For treatment there were many indications, and yet it was always necessary to add a word of caution to the effect that acne was a stubborn and refractory condition. I would not belittle the advantages of correcting such errors of health as those mentioned, nor would I deny that constitutional disturbances influence localized infections not obviously connected with them, but we should not let these associations blind us to more immediate factors.

Acne was one of the first infections treated extensively by Wright. He de-

liberately omitted all other treatment, and prepared vaccines of the infecting organism. By injecting suitable doses of this vaccine at intervals of a few days he succeeded in promptly curing a large majority of his patients. This had not previously been accomplished. Boils and carbuncles also usually yield readily to the vaccine. The treatment has also been tried for many other conditions, and often with brilliant results. The list includes certain localized forms of tuberculosis, gonorrheal joints, some inflammations of the bladder and large intestine, and many other diseases.

Pyorrhea alveolaris would seem to be an infection particularly suitable for vaccines. It is localized and chronic, and suggests a peculiar vulnerability of a special tissue in the individual attacked. The difficulty in the treatment seems to lie in picking out the causative bacteria from the motley flora of the mouth. Perhaps Wright's method of estimating the opsonic index will prove adequate to this task. It is probable that only a very few species of micro-organisms will be found to be causative. When they have been more definitely studied, it should be relatively easy to determine the offending organism in any given case by cultures from the patient's gums. Progress in this direction has already been made, and not a few instances of very successful treatment of pyorrhea by means of vaccines have been recorded. Sometimes a vaccine composed of a single kind of bacterium has been sufficient for a cure, in other cases two or more species have been needed.

The injection of the vaccine and the local effect at the site of the puncture are not particularly annoying, and patients soon forget them as they appreciate the improvement in the condition of the mouth. While we cannot yet say that the vaccine treatment of pyorrhea is fully developed, the results have been so favorable that moderate display of enthusiasm for it is justified. In the near future it should be tried carefully and conservatively in a large number of cases, and the results should be submitted to your profession for its judgment.

It is not too much to expect that when this shall have been done, the vaccine treatment of pyorrhea will outgrow the stage of experiment and will be recognized as a valuable addition to our armamentarium.

In conclusion, I wish to thank you for the privilege of sharing with you in the discussion of Dr. Merritt's timely paper, and to express my hope that the reciprocal interchange of ideas between students of the two great branches of the art of medicine to which you and I respectively own allegiance may become general, that we may the better work together and with our combined knowledge attack more successfully our life-long enemy—disease.

Dr. HERBERT L. WHEELER, New York, N. Y. A complete discussion of this paper would require so much time and space that I shall only attempt to touch the subject here and there. In order to understand the working of those fundamental powers in nature that warrant defense against disease and infection of all kinds, it is necessary to appreciate how nature, by a power of selection, has preserved those individuals who have most readily developed those qualities that result in self-preservation, and has eliminated those members of the species who have failed to develop such qualities as would preserve them from the attacks of disease.

With an understanding of this condition, it will be seen that the valuable and intelligent paper we have just listened to is an attempt to describe the *modus operandi* that nature has developed in order to preserve the living organism from injurious attack by pathogenic bacteria. Constant successful attempts on the part of nature to bring about immunity from bacterial attacks are seen in cases where infectious diseases like scarlet fever, measles, chicken-pox, etc., make the individual immune from further attacks from the same disease. That is, through some power produced by the disease, the individual has acquired immunity against this infection.

Some species of animals have what is

called natural immunity, *i.e.* these animals are not susceptible to certain diseases, and again we observe that some diseases run in families, for instance, carcinoma, gout, insanity, and tuberculosis. This seems to show that there may be inherited susceptibility or inherited immunity. Again, a given individual varies greatly in his powers of resistance at different times and under different conditions. I speak of this because what is true of an individual is true of the cells or tissues of any organs of an individual, and you will see, that this has a bearing upon the disease which we are discussing.

You will remember that there are various ways of obtaining immunity from the attacks of disease. I have spoken of natural, acquired, and family or inherited immunity. The paper is dealing with what may be called anti-bacterial or antitoxic immunity, for it is practically concerned with the protective substances of the blood stimulated to their protective activity by the action of attenuated bacteria, and in this particular case the immunity to be secured is protection against the disease of pyorrhea alveolaris.

At this very point a troublesome question presents itself to me, which I am sure will also trouble the essayist. Is pyorrhea alveolaris a bacterial or infectious disease? As far as I know, no one has successfully demonstrated the specific bacillus of this disease. Goadby in his treatment used a mixed serum infected with several of the staphylococci group, which is made up of the several varieties of the pus germs that are found normally upon the skin surfaces of all individuals, and also upon the mucous membranes; these bacilli but seldom enter the tissue or make trouble except through lesions in the surface of the mucous membrane or the skin, so that the evidence so far seems to indicate that if pyorrhea is an infection, its chief causes are the staphylococci and streptococci, and unless there is some means of entering the abnormal tissues for these bacilli there is seldom infection from them. Under these circumstances, can

we, with our present knowledge of the subject, conclude that the primary cause of the disease must necessarily be a bacterial infection?

This, in my opinion, is not proved, for no bacteria found so far will meet the demands of Koch's law—*i.e.* to produce the disease by the alleged specific germ—and while there doubtless is a germ infection in all true cases of pyorrhea, the evidence, I believe, will show that there is a previous disease of the tissues at the gingival margins of the gums. This primary disease of the gingival tissues may be excited by either local or constitutional causes. The prevailing opinion at the present time favors belief in a constitutional cause of metabolic origin, though local causes undoubtedly play a part.

If this is the case, we would not think of securing immunity by antitoxic or anti-bacterial serums any more than we would in Bright's disease or arteriosclerosis. This does not necessarily invalidate the contention that benefit is derived from Goadby's treatment of using a mixture of staphylococci, for the general tone and resistance of the whole system against staphylococci and streptococci might have been considerably raised toward a point where immunity might be present, very greatly improving the pyorrheal condition, and yet the primary cause might be untouched, and a recurrence of the disease might occur as readily as before the serum treatment.

While this suggestion of serum therapy is very attractive and offers alluring temptations to resort to it, I wish to call attention to the complex operations required in the application of this kind of treatment, and to the grave injury that might arise from an infection of the patient if the treatment is not carefully and scientifically carried out. It is doubtful if the education of the dentist fits him to attempt this work.

The description of the opsonic bodies given by the essayist is not perfectly clear, and the quality of agglutination may as readily be produced by the so-called cast-off receptors of the "side-chain" theory of Ehrlich, as by the so-called opsonins

of Wright and Douglas. Thus far the chief function of the opsonic bodies seems to be the stimulation of phagocytosis. The opsonic theory seems to agree with that which observation indicates, namely, that phagocytosis of micro-organisms by the leucocytes is impossible without the aid of some such property in the serum. It seems that Wright and Douglas consider that the opsonins act directly on the bacteria; as to whether these substances stimulate phagocytosis does not seem to be definitely settled. It is believed that the opsonic or bacteriotropic substances act, although the action of bactericidal serums has yet to be definitely established. It is also common knowledge that bactericidal serums have not been very successful as curative agents, and at present the outlook is not very encouraging.

Experiments upon animals indicate that the serums are much more useful as prophylactic measures than as curative agents, the immunity conferred being of short duration, the anti-bodies being destroyed within two or three weeks. Under these circumstances it would seem that there is much opportunity for further investigation along these lines before any very definite knowledge can be claimed.

The statement that antiseptics can take effect only on those bacteria with which they come in direct contact should be taken as a warning against the indiscriminate use of antiseptics in the oral cavity, and especially against proprietary remedies of unknown composition, for it is evident that in many instances the use of antiseptics in the mouth will prevent the fluids usually found there from performing their function of protecting the various oral tissues from the attacks of infectious disease.

The term pyorrhea alveolaris is such an elastic one that it is often very hard to understand the true condition of a case from the description published, which is confusing; but while the primary exciting causes of this disease may vary widely, it would seem that the essayist has spoken truly when he says "We find the circulatory system to be

the chief factor in the chronic and progressive nature of pyorrhea alveolaris."

I believe this to be *always* the case, and in most instances, if the original exciting cause can be found and eliminated, the progress of the disease can be stopped, and unless this first cause be found and removed, any and all other treatments are only palliative. I also believe that until the members of our profession are so well trained in a knowledge of what constitutes a normal condition of living tissues and a pathological one that they are able to discriminate between the great variety of first causes which may obtain in this disease, we will not make any great progress in curing pyorrhea alveolaris.

The last words of the essay are worthy of being forever retained in our memory: "Whatever may be the therapeutic measures employed, their success will be found, in every instance, to be proportioned to the accuracy with which they interpret and conserve the forces of Nature."

I congratulate the essayist on his evident appreciation of the complex situation that may obtain in the disease which he has so ably discussed.

Dr. G. R. WARNER, Grand Junction, Colo. A writer makes many sacrifices and exhibits much courage if he works in the fields of physiology, pathology, and bacteriology. The essayist has not only made sacrifices and shown courage, but has given to this association freely of the product of many hours of reading, many hours of thought, many hours of hard work. The product is good. The result is worthy of the writer, and the literature of dentistry is enriched by the essay just read.

The essayist's remarks on antiseptics are especially valuable, combating the popular and erroneous ideas in regard to this subject. He calmly, sanely, and logically treats of the use of antiseptics in pyorrhea and their practical everyday application.

I had the pleasure of hearing a paper read by Dr. Gerald B. Webb at Colorado Springs, Colo., in June 1907, on "The Opsonic Treatment in Pyorrhea Alveo-

laris." Dr. Webb had shortly before returned from the laboratories of Wright and Douglas in London, and had done considerable work in the opsonic treatment.

Dr. Webb reported the treatment of one case of pyorrhea, with an entire cessation of the formation of pus without the aid of any local treatment. The organism in this case was the staphylococcus albus. Mr. Goadby of England, in an examination of ninety cases, could find no one organism with sufficient regularity to establish it as the causative factor in pyorrhea alveolaris, although the staphylococcus occurred in many of the cases.

Others have treated pyorrhea by the opsonic method with more or less success. How permanent the results have been I do not know.

But as the essayist says, the technique of the opsonic treatment is rather too complicated at the present time for general use in the treatment of pyorrhea. The subject-matter of the essay is, however, none the less valuable, and should set investigators to work. It should incite them to carry on the work of Wright and Douglas, to supplement the experiments of Goadby. It should produce practical results in the way of greater knowledge of the bacteria of this disease and better understanding of the protective substances of the blood, and a rational application of that knowledge to the treatment of those cases of pyorrhea which, under the present conditions, are the bane of the average dental practitioner's life. I think that the specialist in this work would not refuse assistance from even so humble a source as the opsonins of the blood.

All this means hard, persistent work. It means the work of trained minds with all the necessary aids at hand. It cannot be done by the busy practitioner, but requires the entire attention of experienced investigators.

Where is our profession going to look for these men and this equipment? There is only one place to look—that is within. What is to be done we shall have to do ourselves, and I believe that

this National Dental Association is the proper body to inaugurate this work in the broad manner necessary, or rather that it is the proper body to carry this work to its final perfection, for the subject has already been taken up by some local societies. When this has been done, the questions so well discussed in this paper, and others of equal importance, can be carried to their ultimate conclusion.

Then, and then only, will our profession rise to the heights which it is destined to reach.

Dr. JAMES E. POWER, Providence, R. I. In the consideration of the subject which has been so ably presented by Dr. Merritt today, we find that science not only discovers newer manifestations—or rather, newer interpretations of old manifestations—but it also reclaims many manifestations which had been formerly discovered. The fever temperature of the body, for instance, was never regarded and treated as though it were aiding in the devitalization process. We find now that many observers are convinced that it assists in destroying the process of infection, by the changes it produces in the blood and tissues. We also find almost a revolution in the conception of the pathology of inflammation.

It is now a well-recognized fact among students of disease and its causes that antiseptics have not done all that was expected of them, nor have we accomplished by their use all that we thought we were accomplishing.

Investigators have proved beyond any reasonable doubt that the tissues have the power of resisting the action of micro-organisms, and also that when antiseptics are applied for the purpose of destroying bacteria, they not only inhibit or destroy the action of bacteria lying upon the surface, but that they also destroy the natural resistive forces of the tissues. Does this explain why so many surgical operations, such as amputations, incisions in abscesses, and even major operations performed under seemingly crude methods, resulted in favorable recoveries? Does this also help to

explain why surgical operations in the oral cavity, even if in an uncleanly condition, result in favorable recoveries?

It seems that in regard to the treatment of certain diseases, and especially of the one which we are considering to-day, we have been waging war against the micro-organic army without giving the proper amount of attention to those factors which may have enabled it to remain defiant all these years.

We are conscious, indeed, of the fact that a great deal has been accomplished, but much more will be accomplished in the future, because dentists are slowly but surely studying those factors which have in the past prevented us from accomplishing our ends in fighting disease. Possibly we have been using too much time in perfecting ourselves along the mechanical lines of our calling, but the time is now here when in order to intelligently treat such diseases as the one under discussion, we must direct our attention toward the blood and the tissues which render these diseases possible. Nor can we be satisfied with a detailed study of bacteriology. We must make a detailed study of biology as well as physiology, anatomy, and pathology. Nature does much to repair her injuries, and she is not satisfied with restoring the injured part to its original condition, but she seems to reinforce that part, as if to insure it against further injuries, as, for instance, in the formation of a scar after the union of broken soft tissues, or in the formation of callus following the repair of a fractured bone, etc. Even in view of all these statements, which are based on facts, it is our duty to improve upon Nature, and to regard her efforts at self-repair simply as valuable hints of what she is trying to do. We must remember that we can and do improve Nature's work in this line. Nature is neither a reliable physician nor a surgeon. We all know that, left to Nature, wounds such as sinuses or cavities in the mouth after operation will close from the top, and cause irreparable injury. Surgery, whether oral or general, demands that these wounds close from the bottom, therefore we use

gauze to retard Nature's work. Professor Welsh says: "Nature is neither kind nor grateful, she simply obeys the laws and is very conservative."

I feel sure that we may all agree with the essayist that the most important bodily substance with which we should familiarize ourselves is the blood—not only its composition, its quality, and its pressure, but the conditions which may cause these to vary.

In order to construct a skeleton upon which we would later place flesh and form, we commence with the description of the corpuscles. A red corpuscle is composed of an envelope filled with hemoglobin. This so-called envelope is chemically composed of three substances, the phosphorized fat lecithin, the monatomic cholesterin, and nucleo-proteid, and keeps the hemoglobin from passing through the membrane and dissolving itself in the plasma of the blood. When the red corpuscles lose their power of retaining the hemoglobin, they themselves are dissolved in the blood, and in the treatment of disease we must learn not only what causes the destruction of the blood corpuscles, but also how to formulate methods which will alter the conditions which are conducive to disease. Investigators have demonstrated that the pressure of the plasma is normally less than that exerted within the corpuscles. Any protoplasmic poison will so act upon the envelope containing the hemoglobin that the destruction of the envelope will be followed by a diffusion of the hemoglobin into the blood plasma. This condition we recognize as hemolysis.

Hemolysis may be produced by a variety of causes, but the one cause which interests us most is the change of the blood pressure. As long as the pressure of the blood and that of the corpuscular contents is equal, or nearly so, no hemolysis will occur, and we have what is known as an isotonic solution. If the pressure of the solution in which the corpuscles are suspended is reduced, the corpuscles will absorb the water, swell, and finally burst. There are two factors which will cause hemolysis. One

which devitalizes the tissues of the corpuscles in which the hemoglobin is inclosed, causing a diffusion of the hemoglobin without changing the pressure, and the other which causes a change of pressure between the corpuscles and the blood plasma, causing water to be absorbed by the corpuscles, with a distention, and final destruction. Both of the factors which produce this condition are developed in the blood. According to the experiments of Bourdet and others, we have a definite law, namely, that the blood serum of an animal of a species A, if this animal is repeatedly treated with the blood of a species B, acquires the property of causing hemolysis of species B. Hemolysis may also be produced by feeding an animal with the blood of another animal. Belfante and Carbone have proved by their experiments that when a specific hemolysin is injected into the blood of an animal, death of the animal generally follows, and the hemoglobin is found afterward in the urine.

Nuttall, Buchner, Bourdet, Pfeiffer, and Metchnikoff have also shown that the serum contains another substance which they call alexin, and which has the power of preventing not only hemolysis, but also bacteriolysis. This power is known as cytolytic power, and is brought about by the injection into the blood of substances which will increase the sensitiveness of the disease cells toward the natural tissue cells, and which have the power of destroying them. Bourdet named the substance which he produced in the blood by injection, and which had the same power as the alexin, but to an increased degree, *substance sensibilatrice*. Hemolysins and toxins act exactly alike in their reaction. Hemolysis and agglutination of red corpuscles generally accompany each other, and in many cases seem to be dependent upon each other.

Gruber, Durham, and Widal discovered that hemagglutinins and bacteriagglutinins are analogous. Gruber believes that the agglutination process is simply one of the stages of bacteriolysis, and Koch has proved that bacteria will produce hemolysis. Wright and Douglas

have shown by their experiments that the phagocytic power of the leucocytes was not so active when placed in a test tube after having first washed the leucocytes free from serum, and that their action upon bacteria was greater when the leucocytes were left in a solution with the serum. The logical conclusions which have been accepted and proved were that the serum contained something which either destroyed bacteria or rendered possible their destruction. This substance was called opsonin. Experiments have proved that while the test tube containing the blood corpuscles and serum showed a more marked action upon the bacteria, the effect was due to an indirect bactericidal action of the opsonin, perhaps in the way of causing some change in the structure of the bacteria, which caused them to be attracted by the leucocytes, which in time destroyed them.

It has been known for some time that if gradually increasing amounts of toxic but not fatal material are introduced into the blood of animals, such animals will in a given time be able to withstand amounts which would prove fatal if they were introduced at the beginning. This was perhaps the first step in the development of the idea of producing the substances which help to destroy bacteria by increasing the resistance of that once indefinable something which we now call opsonin.

The experiments of Landerer in his treatment of tuberculosis by intravenous injections of hetol; of Lowry and Richter in producing leucocytosis by the use of pilocarpin; of Mikulicz in increasing the post-operative infections by injecting nucleinic acid into the periosteum; of Buchner in curing anthrax by producing fever through the injection of sterilized emulsions of Friedländer's pneumo-bacillus; of Bier in producing curative fever by the intravenous injection of alien blood, and of Opie, who has cured or greatly improved the condition of dogs affected with tuberculosis of the lungs by the injection of sterilized pus taken from another dog and injected into the pleura of the affected dog—all these

experiments prove the soundness of the essayist's recommendations.

One writer says that there is a physiological and a pathological therapeutics. Physiological therapeutics is the application of means that will directly antagonize the disease. Pathological therapeutics indirectly combats the factors producing disease by working along the lines hinted at or suggested by the organism in its effort to destroy the disease; of these two, this writer says, pathological therapeutics is the better. The essayist has wisely pointed out that the laboratory knowledge, which is so essential and complex, can only be acquired by careful study, before we are capable of doing much work along the lines suggested in the paper. Possibly a word of warning is in order. This work should first be done only by expert pathologists, otherwise the enthusiasm with which all new processes are usually received will cause the individual to believe that all that is required is to inject so many millions of bottled bacteria into the tissues of the patient, the result of which operation is very apt to be failure. Lister, when working on antiseptics, succeeded, because he dressed the wounds of the patients with his own hands, and would not entrust his method to incompetent hands, while Koch suffered failure with his tuberculin.

Nearly all medical progress has been brought about by the recognition that all vital phenomena in both health and disease are subject to intelligible laws. Physiological chemistry, experimental pathology, and therapeutics have destroyed the curtain of doubt, and have set knowledge in the place of superstition and ignorance. The invention of the thermometer, the laryngoscope, the ophthalmoscope, and the speculum have done much toward facilitating the fight with disease; also auscultation, percussion, and microscopy have done their share. All of these additions to the study and the treatment of disease were at one time farther remote from offering valuable curative possibilities than the ones suggested by Dr. Merritt in his very valuable paper.

Dr. JOSEPH HEAD, Philadelphia, Pa. Dr. Merritt's paper is so far-reaching and covers such a large field that in discussing it one hardly knows just which point to take up. There is one point, however, that especially appealed to me, and perhaps Dr. Merritt can give us a little further light on the subject. I refer to his remarks on the stimulation of the opsonins by auto-inoculation, which plan sometimes produces a cure. He specially mentioned tuberculosis, and spoke of the fact that certain infections are let loose in the circulation which by stimulating the opsonins cause the patient to recover, and yet, as I understand it, this very auto-infection is the cause of miliary tuberculosis, a form of tuberculosis that is only interesting from the standpoint of the post-mortem table. One of my dearest friends, one of the brightest physicians the country has seen in years, died in just that way about six months ago. He had suffered from hip-joint trouble since he was a child. All at once inflammation of the hip set in, together with a slow fever; this fever continued, and in a month he was dead. His death was undoubtedly caused by the fact that the tuberculosis had extended and had broken into the veins, and the veins had carried the germs all through the system. This, of course, does not militate against Dr. Merritt's paper, but it simply shows that the number of bacteria that are to be inoculated into the system must be carefully measured, and that although Nature may be very wise, she at times needs to be restrained and guided.

As to Dr. Wheeler's remarks concerning pyorrhea, in which he very truly says that no specific germ for pyorrhea has been discovered, I have noticed mouths in which almost all sorts of germs resided and grew. We naturally would expect infection to be caused by one germ. I have believed that where there is filth, and bacteria are allowed to collect in the mouth and around the teeth, and the resistance of the tissues is lowered, we shall have infection, and this infection would be absolutely in accordance with the kind of germ that happens to

be present. If it be the streptococcus, we would have a streptococcus infection. If the staphylococcus, we would have the staphylococcus infection, and if it is the pneumococcus, which is frequently found in pyorrhea, we would have the pneumococcus infection. This, as Dr. Wheeler has pointed out, is one of the difficulties which we shall have to overcome in this particular disease, but if by a process not quite so complicated we could find out the particular germ that is causing the particular pyorrhea, we might by such a process of inoculation prevent the germ from traveling through the lymphatic vessels along the peridental membrane.

I wish to thank Dr. Merritt for his paper, and I feel that the profession is to be congratulated that such an essay has been presented.

Dr. M. L. RHEIN, New York, N. Y. Today a contribution to pathology and to the therapeutic process of diseased conditions of the mouth has been presented to us that marks an era in the advance of stomatological treatment. The presentation of this paper, in my opinion, will become of historical value in dentistry. It is such a concise and logical exposition of the pathological conditions that exist in certain conditions of disease of the mouth as has never before been presented to any dental society or in any dental periodical, and the association is to be congratulated that this paper has been presented here. A great deal has been said about the misuse of the name pyorrhea alveolaris, and its confusing effects in regard to the diseases affecting the peridental tissues. The condition of which the writer spoke today is the only condition in which this name is justifiable. His exposition refers to the condition of true pyorrhea alveolaris, and everything that he has said must be taken as relating to this condition, and must not be confused with many other diseases of the peridental tissues. Dr. Wheeler in discussing the paper very properly spoke of the value of finding out the predisposing causes in conditions of this kind and in their treatment. But if we are able to find the predisposing causes and treat them in time, we do not find that disease

of which the writer spoke. The condition that we are discussing is a pyogenic condition of the peridental tissues that may be called the sequence of the exciting cause. Its active condition has passed away; it is decidedly, as the writer has so well said, a condition in which the leucocytes or phagocytes have failed to bring about the clinical effect which we obtain in the majority of cases of this kind. A great portion of the discussion seems to have missed the valuable point, that surgical interference is the keynote of success in the majority of pyogenic conditions of the peridental tissues. You can have as large a quantity of leucocytes as possible in some of these cases, and all you have to do is to proceed with the surgical instrumentation to produce these leucocytes, and still it fails to accomplish its purpose. Wright's investigations have demonstrated to us the fact that in such cases the opsonins are lacking. For this limited variety of cases the antitoxin or vaccine injections are recommended. As Dr. Williams very truthfully said, there is no place in the human economy where natural conditions so greatly tend to produce a favorable condition for this sluggish chronic pyorrheal condition as where there is a lack of opsonins, of which we know so little at the present time. The clinical experience with antitoxin and vaccine injections has, however, demonstrated their value beyond a doubt, and these injections will surely prove to be very valuable in the treatment of true pyorrhea alveolaris. The danger of this treatment lies in an unnecessary use of it, and the secret of the discriminating use of these vaccines lies in differential diagnosis. If we can find the exciting cause, and if an active condition with sufficient opsonic index is present, its use is absolutely unnecessary. I fail to see, however, that there should be any danger from this treatment if it is used intelligently and with discrimination.

Dr. MERRITT (closing the discussion). I first wish to thank those who have added so much to the interest of the subject by their painstaking discussion. I was pleased to hear the note of warning

sounded by Dr. Head as to the dangers which may attend auto-inoculation in large foci of infection. Nothing truer can be said than that Nature often needs to be guided. In large foci of infection, such as obtain in pulmonary tuberculosis, the danger lies in the precipitation of unmeasured doses of living organisms into the blood stream, which is not infrequently attended by grave consequences, and always by an exaggeration of the symptoms. It will be remembered that in the use of vaccines one is employing dead organisms, through which the desired immunity is obtained, and this without the dangers which attend the administration of living organisms, as in auto-inoculation. The value of auto-inoculation in the treatment of certain infectious diseases, such as gonorrhea and pulmonary tuberculosis, has been proved to be such as to give it a distinct therapeutic value, and one which must be reckoned with in any study of immunity and of the methods by which it is obtained. In the treatment of the latter disease by auto-inoculation as carried on in the hospital at Frimby, England—to which reference was made in my paper—the distinctive feature consists in that auto-inoculation is systematically induced through the agency of carefully regulated exercise, this exercise being prescribed with the same care as that which characterizes the employment of any other therapeutic measure. The temperature and the opsonic index are taken at frequent intervals as a guide to the amount of exercise indicated in any given case. An increased temperature with subnormal opsonic index would show that the exercise has been carried to excess. Mild forms of exercise are prescribed in the beginning of the treatment, which is gradually increased as the symptoms permit, until the patient is engaged in heavy manual labor for several hours each day. Herein we see its chief value, namely, Nature's protective forces being guided and directed by skilled hands to the end that such a degree of immunity against the infecting organism is secured as to result in extermination of the bacteria within the

foci of infection, and in the complete restoration to health of the patient, and this without the employment of any other form of therapeutics. The success which has attended this treatment has been such as to engage the attention of the whole scientific world. A report of the work being done at Frimby may be seen in the *Lancet* for January 25, 1908.

In pyorrheal infections, because of the circumscribed area involved, little dependence can be placed upon auto-inoculation in the treatment of this disease. Whatever its influence may be, it is probably salutary, as can be seen in massage of the gums. It is doubtful whether auto-inoculation in pyorrhea is ever attended by serious consequences. I had thought that I made it clear to Dr. Wheeler and to others that there is at present no good evidence in support of the theory that there is a specific organism which could be regarded as an etiologic factor in pyorrhea. What I did say was that the organisms universally present in pyorrheal infections are in every instance a complicating factor, and may be regarded as being the chief obstacle to success in the treatment of this disease. On this point Dr. Harold Simms of England has this to say in a recent number of the *Dental Digest*: "However much one may cling to the belief that pyorrhea is a constitutional disease, there can be no doubt that almost all the accompanying symptoms and complications, slight or otherwise, are due solely to the enormous quantity of pus-producing staphylococci that I have described as being invariably present." The value of the opsonic treatment depends upon the fact that vaccination with a quantity of killed bacteria of the same nature as those present in the infected area has the effect of increasing the bacteriotropic substances of the blood, so that the patient is himself enabled to overcome the disease by the stimulation of his own protective machinery.

The next order of business was the reading of a paper by Dr. EUGENE S. TALBOT, Chicago, Ill., on "Acidosis, Indicanuria, Internal and External Se-

cretions: the Effects upon the Alveolar Process and the Teeth."

[This paper was printed in full in the *COSMOS* for September, vol. 1, p. 947.]

Discussion.

Dr. S. A. HOPKINS, Boston, Mass. In speaking on this subject I wish to say that no one in the profession is more deeply impressed with the injurious results of proteid decomposition than I am. With me this is a fetich, an obsession. I feel that the injurious effects of the absorption of toxins, the result of proteid decomposition in the intestines, has never been fully recognized by dentists, and am grateful to Dr. Talbot for bringing this matter again to the attention of the dental and medical professions.

Now, if it is true, as Dr. Talbot suggests, that the various diseases which he calls attention to as affecting the pulp are caused by a decomposition of proteids which produce indol, and show indicans in the urine, then we have one of the most important and startling facts in medicine. We have here the explanation of those wonderfully subtle influences which are known as susceptibility and immunity. We should, then, have organs susceptible to disease if indol and other poisonous products of decomposition are taken up by the system, and immunity if the poisons are absent, and we could judge by the presence of indicans whether the patient is susceptible or immune. We would know why the texture of the teeth seems to vary and why the teeth become more susceptible to decay at certain periods than at others. We should be able to explain the absorption of the alveolar process and its variations, if, as I say, we should be able to establish the truth of this important theory. If we could believe that in acidosis and indicanuria we have found the true explanation of these changes which take place in the teeth, we should have gone far toward the control and improvement of the influences which affect these organs. The explanation given by the essayist is brilliant, fascinating, and one

which we should be glad to embrace, but I cannot believe that we are fully justified in accepting this theory until the matter has been more fully investigated.

If we find that tooth-degeneration and disease result chiefly from indicanuria, the remedy would be that pointed out by Metchnikoff, *i.e.* the introduction into the intestines of the bacillus of Messol by means of yoghourt, which is the sour milk produced by this bacillus. Other lactic organisms might also be used with marked effect, and these no doubt might cause the desired immunity from disease and the marvelous prolongation of life which has been noticed in those people who live upon sour milk. Some people might feel that dentistry and death were to be preferred to this remedy.

For the treatment of diseases of the digestive tract, for Bright's disease, arterio-sclerosis, many skin diseases, gout, rheumatism, etc., this treatment is said to be warranted. I question, however, if we are as yet justified in depending upon it for the control of the ravages of dental caries.

DR. EDWARD C. KIRK, Philadelphia, Pa. It is a matter of great encouragement to me, Mr. President, that a paper of this sort has been presented to this body, and that it has been so sympathetically received. I have watched the work of Dr. Talbot for many years with a great deal of interest, and while I have disagreed with him at times, I am thankful to him that he keeps everlastingly hammering away at it and attracting the attention of his *confrères* to the point that there is something more, something larger, something greater in our professional work than the simple repair and patch-work we are so much inclined to do, and which demands so much time and attention. I agree with him, as all must agree with him absolutely, that we cannot ignore the constitutional factor that is behind our work. We are working on vital bodies and with living things, and we cannot get rid of that factor in our work. Therefore the subject that he brings before us today is to my mind—I may be over-enthusiastic about it—the most important prob-

lem that we have to consider. It goes without saying that it is a vast problem, and an intricate one, and I gather from the hearing of Dr. Talbot's presentation and from the reading of his paper that he comes before us not in a dogmatic way, with a cut-and-dried and finished answer to this problem, but that he offers us a working theory, an hypothesis, a point of view, and in that spirit we must accept it. I am thankful to him because his report is suggestive of things to be done, and of ways to do them.

I have for a number of years myself been interested in this problem, but I have been making my attack upon it from a somewhat different point of view. I am working toward the same end in the solution of this same vital problem in respect to its effects in the mouth as we observe them. One of the most important things in attacking a problem of this sort is our attitude of mind toward it, and the necessity of creating, as it were, a portal of entry into the subject so that we can attack it. You remember in the story of Faust that he knew that he was under the influence of some evil spirit; he did not know what it was, but he felt the effects of it, and you remember the incantation scene, where he brings this evil spirit before him so that he could parley with it, and squarely discuss the case with it.

Each man attacks the problem of disease in a different way. My portal of entry has been, as I say, from a somewhat different direction than that taken by Dr. Talbot. I have been studying this question from the standpoint of normal physiology—that is, the study of the human machine as a machine in its normality and then in its variations which we call pathology; and one of the first things that impressed me very strongly is the necessity for creating in our minds some sort of ideal standard or norm before we can say what is abnormal. I have looked upon the normal healthy human being as the individual in whom in the various processes of this complex act of human nutrition a balance or equilibrium of all the factors exists; not a static but a moving or

progressing equilibrium. So with that fundamental conception I have tried to study the factors of this normal process of nutrition, and it has been borne in upon me very strongly that we have the very closest analogies between the metabolic process of the living body and the ordinary processes of combustion. The body has been likened many times to a furnace in which fuel is taken and used up, with the resulting growth of tissue and evolution of energy expressed in terms of heat, etc. There must be a correct definite ratio between these factors, and I was particularly struck with certain statements that Dr. Talbot has made in his paper with reference to the existence of the condition which he speaks of as acidosis, formation of indican, etc., the result of faulty metabolism, which we find expressed most pronouncedly in those individuals whom he speaks of as alcoholics; that is, in individuals not afflicted with any acute form of disease, but simply people who have gone wrong from bad methods of feeding; they are in a class by themselves, and constitute a very interesting class. I regard these people somewhat as the motorist regards the management of his car. We have frequently had our attention called to the offensive, disagreeable odor and smoke coming at times from the exhaust of this traveling combustion engine, and we say right away—if we have any proper knowledge of these things—that that fellow's carburetor is not adjusted properly, that he is overfeeding his machine, that he is giving the machine too much gasoline, and not enough air to burn it; and when he adjusts his fuel and air supply properly, he reduces this offensiveness to a minimum and gets more power out of his motor. It means that the machine is not properly metabolizing its food. Then what happens? The same thing that may happen to us under similar conditions—he loses power just in proportion as he fails to make the machine metabolize its hydrocarbon food, and the machine runs down. This may happen, for example, in the country, and not knowing how to correct the trouble, the amateur motorist goes off for help; while

he is gone the machine is at a standstill, and the usual ragamuffin comes along and toots the horn, and there being no interference, he toots it some more. Then some of his more adventurous companions become encouraged and get into the machine with their dirty shoes and destroy the covering to the upholstery—produce skin disease. They get in because the machine is not going and cannot go; they enter because they can and because the machine being unable to go at speed cannot keep them out. These ragamuffins that get in are the microbes that finally ruin the car. Now, there is something in normality, something in normal health. Whether you express it as the opsonic index or whatever you may call it, there is something concerned in the condition we term normal health that is in itself a defense against the attacks of bacterial agents. So my interest has concentrated itself upon an effort to bring about normality of nutrition—to so adjust the nutritive mixture for the individual that the amount of energy expressed in units of power shall reach the normal physiological maximum; for under these circumstances I don't think we need fear the attacks of the ordinary microbe.

So much for the analogy. Now we come to practice in regard to it. I have been making a large number of experiments, both in the laboratory and clinically, as Dr. Talbot has, and I have found in my own way that in the question of acidosis, also of indicanuria, there is a relationship of these things to the food habit which has interested me very much. I do not wish to be regarded as making a dogmatic statement, but that is the trend of my feeling about it; that the question of faulty metabolism in a given individual depends upon two things—the amount and the kind of his food in relation to his oxygenating capacity. We get different expressions as these factors are varied. If we take an individual who is fed upon an almost exclusive carbohydrate diet, and if we increase the carbohydrates beyond the point where his oxidizing power is sufficient to burn them up, then we get acid-

osis of a definite type. This acidosis is most interesting, not only with reference to its terminal expression, in its effect upon the mucous glands of the mouth, but upon the glands of the skin, in its power to produce skin eruptions and in its irritating effect upon the urinary passages; it is interesting also because the general nutrition is disturbed during the period of the high acid wave. Now, if this high carbohydrate feeding continues over a considerable period we do not always have a uniform degree of urinary acidity manifested, but it takes the form of a curve gradually increasing until it reaches a maximum, and then it tends to decrease, and it is during the maximum period that we have developed that condition described by Ralfe of London and Tessier of Lyons, France, known as phosphate diabetes. There is over-oxidation of the carbohydrate foodstuffs with a loss of the phosphate element, due to excessive carbonic acid formation which converts the basic phosphates into the more soluble acid phosphates, all caused by improper feeding of carbohydrate food in greater quantities than the individual can burn up. I have tested that out pretty thoroughly and to my own satisfaction, and by re-arranging the food-habit in such a way that the individual gets no more than is properly digested, reducing the carbohydrates and increasing the proteids, I reduce the urinary acidity, and tend to stop the running away of the phosphates and the basic salts by way of the urine.

This is the expression of faulty metabolism in that disorder which we call arthritism—in that class of diseases which the French have very properly, I think, termed diseases of suboxidation. When the individual has insufficient oxidizing power to burn up the nitrogenous products properly, then he develops auto-intoxication, not only by the absorption of intestinal toxins, but by the production of improperly oxidized nitrogenous products, the group of non-oxidized nitrogenous end products which are typified by uric acid, and these are deposited, as Dr. Talbot knows, in the articular apparatus of the body, with a predilection

for the pericemental ligament. I called attention to this matter in a paper which I read in Baltimore at the beginning of this month, and to the coincidence, which I think all have observed, of chemical erosion and interstitial gingivitis in the same mouth. What I want to call attention to today is that they do not exist necessarily at the same time, but that one precedes the other. Some may question that, because we have never yet seen a case of active pyorrhea in a mouth with acid saliva. But the reaction of the buccal secretions changes from time to time as the food habit changes. I regard erosion expressions and acidosis expressions as being distinctly a mark of over-carbohydrate-feeding, or hyperacidity, whereas in the opposite case we do not have erosion, but we do have a tendency to articular destruction.

About many things in the paper I would like to have more information. Personally, I may say, I have not regarded the presence of indican in quantity as being a proof that we had in it a highly toxic element, but I have rather regarded it as a coefficient of the degree of faulty metabolism which produced the indican as one of its terminal products. In other words, there is something behind the indican. Notwithstanding that, I am perfectly willing to admit that it is wise to note that we are dealing with a vicious circle, and that by the absorption of these waste products we have metabolism more definitely interfered with and an increase of these irritative waste products as the result of that vicious circle.

I wish to apologize for taking so much of your time, but I did want to come here, and as a matter of fact I came here especially for the purpose of adding what little I could to reinforce the position of Dr. Talbot in this matter, and to try to arouse a still larger interest in what I believe to be the most important question before us now as dentists—one which certainly will be the problem of the dentistry of the future to solve, because upon the practical solution of this thing will depend our success or failure in treating a large group of the pathological conditions that come before us.

Dr. J. P. GRAY, Nashville, Tenn. I wish to thank Dr. Talbot for this most magnificent paper, and also Dr. Kirk for his discussion of it. I have had some experience in the treatment of pyorrhea, following the line of treatment suggested by Dr. Talbot, and I had the pleasure of being in his office for ten days and watching his successful treatment of pyorrhea by the elimination of indican and acid. I therefore took it up in my own clinic, and have met with wonderful success. I cannot understand how anyone can fail to appreciate the fact that if we have a poison in the blood, such as we certainly have if we have indican, we must eliminate that poison before we can successfully treat the disease. Every dentist should and can make an examination of the urine, and determine whether there is an excess of acid and whether there is indican, and you will find that your patients will recover much more quickly if these are eliminated.

Dr. Kirk referred to the burning up of the excess. I know from my own personal experience that during a breakdown of my own physical condition from nervous trouble and overwork, after eliminating the nitrogenous foods I began to improve as I began to eliminate the acid and indican from the blood, and I wish that everyone here would study this paper and Dr. Kirk's discussion of it after their publication.

I wish to say while on the floor that I do not believe that to this association within the past fifteen years a more scientific paper than that of Dr. Talbot has been presented. We as a profession must begin the study of the science of medicine, and then prevent disease, instead of trying to fill teeth all the time.

Dr. TALBOT (closing the discussion). The only reply to Dr. Hopkins that I wish to make is this, that these pathologic conditions in the mouth are due to toxins in the blood. They can be definitely studied by such visible signs as urinary analysis. By treating these conditions of the blood, we restore the local manifestations in the mouth to normal. We do not know much about these toxins,

but the analysis of the urine tells us what the general condition of the system is.

Dr. Hopkins' query as to whether decay of the teeth is due to indicanuria *per se*, is prompted by an erroneous impression. I wanted to bring out in this paper that tooth-resistance is lessened from constitutional causes. That is why we have rapid decay of the teeth; at times pulp-degeneration and decalcification go on owing to want of resistance, which is due to systemic conditions. In working along these lines, I have come to firmly believe that these conditions are visible and can be examined, as Dr. Gray has mentioned. Dr. Gray's experience has been mine for a number of years, not only with my patients but also in my own condition.

I fully realize that one swallow does not make a summer, and I wish that somebody in this country or abroad would take up a similar line of research. It does not seem to me that much progress is being made, although I continue working year in and year out. I have brought this subject before the profession a number of times, and yet I do not know of anyone who has taken up this work. It is very simple, and it seems to me that students should be trained to find out whether my investigations are correct or not. It does not make any difference to me personally, because I am doing the best I can. What we need is more research work in our schools, and it is unfortunate that we have no laboratories in the schools well equipped for this work. It would not take long to find out whether this research work is correct or not, and I hope that the schools will do something along this line.

Dr. Kirk's remarks are rather confirmatory of my views than otherwise. I wish to congratulate him on the work which he is doing.

The next order of business was the reading of a paper by Dr. CLYDE DAVIS, Lincoln, Nebr., entitled "A Method of Treatment of Purulent Empyema of the Maxillary Sinus."

[This paper is printed in full at page 42 of the present issue of the COSMOS.]

Discussion.

Dr. L. D. ARCHINARD, New Orleans, La. I must preface my remarks by thanking the essayist for a copy of his paper, which, unfortunately, was received only on the eve of my departure for this meeting.

This subject—the treatment of empyema of the maxillary sinus—is of great interest both to the dentist and the rhinologist, and in recent years, in my humble opinion, is rapidly passing over to the field of rhinology.

No advanced worker in the combined fields of stomatology and rhinology has failed to reach the conclusion that diseases of the antrum are either of dental or nasal origin. Both factors can and do come into play. The widely known fact that the upper second bicuspid and the first and second molars may present the anomaly of their roots actually projecting into the antrum renders such an association in the etiology of antrum affections all the more possible. But I am transgressing, as the author of the paper well says "It is not my intention to deal with the etiology or diagnosis, but simply to present a method of treatment which has proved unusually successful." I fully agree with the essayist when he states that external opening through the oral cavity is fraught with great danger from secondary infection, due to the usually unsterile condition of this cavity. This method of irrigating with hypodermic needle after the closing of the soft tissues strongly appeals to me. The *modus operandi* of treatment described by him, although I have never tried it, seems pregnant with good results, and, I believe with him, will appeal to all as being more harmonious with the principles of surgery than those usually advocated.

Dr. J. P. GRAY, Nashville, Tenn. I desire to say that my discussion of the paper must of necessity be short, as I received it only a couple of days before leaving home, and I therefore did not have time to give it such careful study as I should like to have done, and must rely largely upon an oral discussion instead

of a written one, as is required in discussing these papers.

Dr. Davis has presented to us a good paper, and I agree with him in some particulars.

He did not go into the discussion of the diagnosis of the case to such an extent as he should. He gives no consideration whatever to the condition of the face, or of the bones surrounding the cavity. He has dwelt largely upon the treatment, and states that it is only with the treatment that he is dealing. He speaks of the diagnosis in a short paragraph, and says that we can determine the conditions, or determine whether there is any pus formation.

My opinion is that a thorough diagnosis should be made before any treatment is undertaken. It has been my observation that a majority of these cases are brought about by arrest of development of the maxillary and of the bones surrounding the cavity. Where we find an arrest of development we are likely to find conditions that do not exist in the ordinary normal case.

Even the rhinologist does not take into consideration the fact that there has been an arrest of development in the nasal cavity as well as in the bones surrounding the maxillary sinus. To my mind, it is a well-established fact that where we have an arrest of development of the nasal bones and of the bones surrounding the antrum, the antra-nasal openings are very frequently closed.

The essayist mentions the fact that we are likely to have, and frequently do have, trouble produced by the teeth. If we examine the bones carefully, we will find that in the arrest of development the bones have grown thinner, and that the cavity is crowded upon itself; the teeth have not been arrested in the same proportion as the bones surrounding the cavity lying next to the alveolar process and therefore penetrating the latter.

Upon the most difficult part of the treatment the essayist has not touched. He states that his method is to penetrate the bone above the alveolar process, and drain the antrum. This open-

ing is sufficiently large to allow the exploration of the cavity. Now, in most of the cases which I have observed by dissection, I find that there are many divisions of the bone, and these would be hard to explore. These divisions or lobes are of such a character that they will not drain from one to another, and as a result the operator cannot find them; they are overlooked in passing the probe into the cavity. The operator should therefore produce an opening large enough to allow perfect exploration. Should these divisions be of such a character that if one of the lobes be drained the other is overlooked, then the latter division would not drain until it is sufficiently filled with pus, which passes over into the other lobe, and so on. I have found as many as four of these divisions; it would have been impossible for the operator to drain all the lobes, even using the lowest point in the antrum, and if he knew where the lowest point was located.

The essayist's treatment would possibly be all right, and the disease would yield readily, if he had a normal cavity to deal with, but in the majority of these cases it would not be applicable.

If we were able to dissect the bones of this cavity and of the frontal sinus, we should find in the formation of the bone that at some period there had been an arrest of development, and as a consequence a greater effort would be required than he has put forth in his paper. Since not all cases are normal, he must go further in the treatment, and curette if necessary.

I have found in some of these cavities little top-like pockets, with the small end of the top pointing downward.

I do not know whether I make myself clear or not, but if you make dissections you will in many skulls find these pus pockets.

In nearly all cases you will find a depressed condition of the malar bone, an abnormal formation of the maxillary, and a compression of the nasal bones, as a result the bone is often twisted and a tortuous canal is present rather than a normally rounded cell.

Dr. J. E. POWER, Providence, R. I. I first wish to express my appreciation of the paper and say that I agree with nearly everything that the essayist has to say. In connection with the irrigation of the antrum by means of the hypodermic syringe, I fail to see how he brings about that irrigation. I do some oral surgical work myself, and it seems to me that we would need a specially constructed syringe with a large barrel, to carry a sufficient amount of medicament into the antrum. If you use a syringe seven or eight times, and make seven or eight insertions, it seems that there would be a greater probability of infection from the greater number of perforations than were the opening left open.

The other gentlemen described some abnormal cases. In my experience with cases of diseased antra, if the disease does not yield to treatment in a reasonable period of time, I resort to curettage of the antrum. I believe that in this work a sufficiently large hole should be made to allow the operator to see what he is doing, otherwise he is wasting time, and it is my experience that the dentist seldom makes an opening large enough to see what he is doing. I make it a rule, if a case does not promptly respond to treatment, to make an opening large enough to allow the insertion of a medium-sized curette, and scrape the walls thoroughly. The only disagreeable feature of this method of procedure is the hemorrhage. Yet I question very much whether the patient experiences much more discomfort from that method than from the constant irritation of the insertion of the syringe and the daily irrigation.

Dr. E. S. TALBOT, Chicago, Ill. I simply wish to confirm the remarks made by Dr. Gray. I have given considerable attention to this subject and I have recorded the examination of many thousand skulls, showing that these partitions are very common in cases of arrested development of the face, which of course involves the antrum. These partitions are never fully formed. There is always an opening through the partition from one space to another at the

upper border. I have seen three or four of these partitions in one antrum, and therefore, in the few cases which I have treated, after making an opening from the nose into the antrum, I have invariably placed the patient in a recumbent position on the abdomen, with his head down, so that the secretions could pass out. Dr. Gray's experience and my own would lead me to believe that the treatment recommended by the essayist is not entirely proper, simply because I doubt whether he can obtain results. He may in some cases, but as a rule I do not think that it would be well to adopt his method of treatment.

Dr. DAVIS (closing the discussion). As I stated in the paper, it was not my intention to go into the technique of the surgery of this operation. I fully agree with Dr. Gray as to finding cribriform processes in the antrum which divide the antrum into different cavities, and I merely alluded to that when I said that there are cases which demand curetting. We do find such cases, but I passed hurriedly over the surgical part of it. I did not state where or how you should go into the sinus, except at the time of final closure of the opening.

As to the cribriform processes which divide the antrum into cavities in antrum disease, it is necessary to break those down, and curette the entire cavity. Reference has been made to drainage. All that is necessary to obtain complete drainage through the proper opening is to pass a small spoon-shaped curette to the most distant portion of the antrum, and after inverting, to drag it out until it comes out at the opening. You will thus be able to break down these processes and secure perfect drainage there.

The quantity of fluid to be forced into the antrum depends on what is back of the hypodermic needle. If you only wish to put in a small quantity, the ordinary sized needle is all that is necessary, but if you wish to irrigate thoroughly, you will have to use a larger barrel. You can also apply a continuous pump behind the hypodermic needle, or take a small tube attached to a water-bottle and slip it over the needle. I did not go

into the details of this procedure. What I wished to suggest was that when the antrum comes to close after it has been treated, instead of inserting a tube and allowing it to remain, we should try to induce the soft tissues to close as soon as possible, in order to shut out infection from the nasal cavity; by then penetrating the antrum in different directions, we are able to irrigate the cavity and place it in an antiseptic condition, and not subject it to the infection that comes from the mouth in using tampons.

The next order of business was the reading of a paper by Dr. THOMAS B. HARTZELL, Minneapolis, Minn., on "Root-Tip Amputation and External Drainage for Dental Abscesses," as follows:

ROOT-TIP AMPUTATION AND EXTERNAL DRAINAGE FOR DENTAL ABSCESSSES.

Abscessed teeth are a cause of great distress in the average dental practice to both dentist and patient; to the patient because of the intense pain in acute cases and the tedious treatment in chronic cases; to the dentist because of the frequent failures necessitating a loss of teeth.

Time and experience have taught to surgeons that the safest rule to follow in pus infections is to evacuate the pus early, and to provide free drainage by keeping the wound open so that it must build in from the bottom, permitting the surface to heal last. When an infection is managed in this fashion, success is reasonably certain.

This is just as true of the dental abscess as of any other form of pus infection; but to accomplish a cure is far less easy in dental than in most other forms of abscess, for two or three reasons. The focus is deep and correspondingly difficult to reach, and the drainage is difficult to maintain, because the mucous membrane grows fast, thus shutting off the drainage. To succeed in this work, make the root-canal of the affected tooth as nearly sterile as possible, and fill it with chloro-percha and gutta-percha points. This having been

done, inject the tissue over the end of the abscessed root with a three per cent. solution of alypin, and wait three minutes for the alypin to accomplish thorough anesthesia. Alypin is non-poisonous and non-astringent, and the tissues heal more readily after its use than after the application of any other local anesthetic I have ever used.

After the anesthesia is perfect, with a trephine take out a button of soft tissue as large as you can without interfering with the roots of adjoining teeth. Then, with series of pear-shaped burs ranging from No. 5 to No. 10, penetrate the bone to the root-end, burring off the root-end sufficiently to obliterate all evidences of infection and leaving a clean oval or round hole in the tissues. Then wash out the débris and pack the wound with cotton or gauze saturated in sandarac varnish, wedging the surface of the wound open while lightly packing its bottom. Allow this dressing to remain long enough to permit the formation of a good layer of granulation tissue. This requires from twenty-four to forty-eight hours. You will note that your dressing when removed is hard, although when being placed in the wound it was soft and easy of introduction, thus forming the most ideal substance for dressing any form of abscess where the surface tends to heal faster than the bottom of the wound. The lack of this quality in the ordinary gauze or cotton dressing, permitting wounds of this character to heal on the surface readily, thus covering the infected area before nature has had time to build in scar tissue, is the most common cause of failure in these cases, and can be entirely overcome by saturating the dressing with ordinary sandarac varnish.

This operation is comparatively simple, and if the sandarac dressings are persisted in till the wound is thoroughly healed from the bottom outward, is a most satisfactory one, as you may judge from my percentage of failures, which is a trifle less than seven per cent. in three hundred and fifty-one cases treated in this way. These figures do not include root-amputations in teeth affected

with pyorrhea, but refer only to that class of dental abscess in which root-canal drainage proved useless.

This completed the work of Section III, and the chairman, Dr. McMillen, declared the section adjourned *sine die*.

THE CLINICS.

Note.—Dr. G. E. Savage, Worcester, Mass., chairman of the Clinic Committee, through the magazines and personal letters, invited clinicians to send in a report of their clinics. The following reports were courteously sent for publication. If more clinicians had complied with the request, a fuller report would have been rendered by the chairman.

Dr. W. S. PAYSON, Castine, Me. "Anchorage of Alloy Fillings."

A method was demonstrated of anchoring alloy fillings in badly decayed teeth and conserving the maximum amount of tooth-substance by using a double-headed brass gold-plated rivet, letting one head of the rivet rest in the narrow anchorage and the other head in the mass of the filling, the rivet preventing the smaller part of the filling or anchorage from breaking away. The sulcus usually used for anchorage is cut away, just as little as possible, after the caries has been removed and room is thus made slightly larger than the rivet.

Dr. C. EDSON ABBOTT, Franklin, Mass. "Gold or Amalgam Fillings Inserted on Soft Cement, Burnished under a Cloth Strip."

There are many occasions where it is desirable to insert metal fillings over soft cement, to perfectly seal the cavity, to preserve the color of the teeth, to save thermal shock, to retain the filling and to sustain the tooth. After the cavity is prepared, a thin layer of some soft sticky cement is placed over the cavity. The annealed cohesive gold foil or fiber gold or amalgam, as indicated, is placed over the whole extent of the cavity, a fresh strip of cotton or linen tape is held over the whole cavity, as in taking a matrix for a porcelain inlay, and the whole metallic filling is burnished to an

accurate adaptation with the cavity wall. The cloth strip is removed. In the case of a gold filling, after the cement has hardened, gold is added to nearly complete the contour. Then the margins are cleared of cement, and more gold is burnished on to complete the contour.

In case of an amalgam filling, the cement is removed from the margins and more amalgam is added at once, using a matrix in most approximal cavities, and the filling is completed.

DRS. V. M. RUNDLE, Newton, N. J., and HORACE I. BEEMER, Newton, N. J. "Gold Filling."

The clinics of Drs. Rundle and Beemer consisted of Dr. Rundle preparing on the first day a cavity on the mesio-occlusal surface of an upper left molar and making a gold filling in this tooth according to the methods of Dr. G. V. Black; the following day Dr. Beemer prepared and filled by the same methods a cavity in the disto-occlusal surface of the upper left second bicuspid in the same patient as Dr. Rundle had operated on the previous day, thus bringing two of these fillings approximating each other, and showing the advantages of Dr. Black's methods to the fullest extent, and bringing out with special emphasis the restored interproximal space and the small rounded contact point.

The cavity margins were extended buccally, lingually, and gingivally into areas of comparative immunity from decay. The cavities were made with the occlusal step-anchorage, flat gingival and occlusal seats, and parallel walls. No undercuts or pits were made as aids for retaining the filling, but the general box-like shape of the cavity and thorough condensation of the filling material were depended upon for retention.

This form of preparation makes every part of the cavity readily accessible, so that the filling may be made with a single plugger. Dr. Black's and Dr. Wedelstaedt's special cutting instruments were used in preparing the cavities.

The gingival third of the cavity was filled with unannealed gold, by placing a cylinder in each of the gingival angles

and a third cylinder between them, securely keying the whole mass into place. The remainder of the filling was made with annealed gold. The gold was specially rolled into cylinders and pellets of definite sizes from No. 4 unannealed gold foil, in the manner taught by Dr. Black.

For condensing the gold a hand mallet was used by a trained assistant, giving a blow of about ten pounds, and the force of the blow was augmented by hand pressure of from twelve to fifteen pounds, thus insuring thorough condensation, and the gold during the process of building was malleted firmly against the approximating surface of the adjacent tooth at the point where approximal contact was to be made on the finished filling.

The excess of gold in the interproximal space was removed with a Black saw, and the filling trimmed to form with Wedelstaedt interproximal trimmers and Black knives, careful attention being paid during this trimming not to disturb the approximal contact, after which the whole filling was given a final polish, following Dr. Black's method throughout the whole procedure.

DR. GILBERT M. GRISWOLD, Hartford, Conn. "The Burnished 'Co-Ad' Filling."

Prepare the cavity and its margins, as your judgment indicates, avoiding retaining pits and deep grooves as usually made with an inverted cone bur. Make undercuts with round or oval burs and as shallow as would be sufficient to retain the gold without the use of cement, experience having taught not to depend wholly upon the adhesive property of the cement, although in many cases it would be sufficient. Select instruments with polished surfaces adapted to the size, shape, and location of the cavity. In starting the filling use as large a point as you conveniently can, and one adapted to the undercut of the cavity—it spreads the gold more smoothly and there is less of the "evening up" process later on. Place your fiber gold upon the annealer, cut or tear it into pieces of various sizes—none large—also your cylinders and

rolled gold if you choose those. Turn on the current, and the gold will be heated by the time the cement is ready. In selecting a cement for lining the cavity take one that is "sticky" when mixed thin enough to quickly and smoothly flow over the floor and walls of the cavity.

Mix the cement quickly but thoroughly, carrying it to the cavity before it really begins to set; a double-end bayonet-shaped amalgam instrument No. 2 of E. J. Ladmore's set is good for the majority of cavities, using of course the larger or smaller end according to the cavity. Do not use a steel spatula in mixing the cement, as it is very liable to leave a stain that will show through the enamel walls, especially if the walls are thin. If you have succeeded in quickly placing the cement in the cavity wait a few seconds for it to begin to set, then carry the fiber gold to place, pressing it well into the groove, and if necessary holding it with a fine point while you pack other pieces, so that the attachment with the cement may not be disturbed or broken, until the floor and walls of the cavity are well covered. Sometimes after having covered the cavity with fiber gold it is well to wait a very short time to be sure that the cement is well hardened before continuing the filling; but usually the heat from the gold and burnisher has hastened the setting sufficiently to prevent any delay.

After removing any overlapping cement, and making sure that the margins are free from it, the filling can be continued, using fiber gold or cylinders or both. I have found it of advantage to use both, as the cohesive property of the fiber gold seems to be greater than that of the foil, and if for any reason the foil does not unite, place in a piece of fiber gold, and cohesion will usually be re-established. After the first layer or two of fiber gold, cylinders or foil in any preferred form are largely used, as they burnish to place more smoothly, and I believe more solidly; in the "leveling up" process, however, fiber gold spreads more readily and is of great advantage. I like foil, especially for the surface, and

in many cases a layer of rolled gold works beautifully and leaves a fine surface. . . . In placing the pieces of gold, first press them gently to place before burnishing. This saves dragging and displacement before the attachment is made. Burnish each piece. This is of the greatest importance, as a dense filling cannot be made if several pieces are placed before burnishing. Trim and polish in the usual way. It is the opinion of the clinician that the secret of success lies wholly in the annealing of the gold and in the proper application of the required degree of heat.

We do not give as much credit to the blued burnisher as some do, for although a burnisher nicely blued and highly polished by a skilful instrument-maker affords a great deal of satisfaction, a highly polished instrument not blued will accomplish the same results. But an electric annealer is necessary for guaranteeing the best results. If an electric current is not obtainable, anneal the gold on a sheet of mica.

Some of the points in favor of inserting a filling by this method are:

(1) We believe it to secure a thoroughly tight filling, and one which better supports the walls of a cavity, in many cases lessening the need of "extension for prevention."

(2) It gives a very firm filling, as it adheres to the walls as well as being retained mechanically.

(3) It gives a very dense filling, as none but polished surfaces are used in condensing the gold.

(4) The insertion of the filling is much easier for the patient, as the mallet is not necessary.

(5) It is also much easier for the operator, as there is no chance for "rocking" and much less strain upon the eyes, as larger points can be used.

(6) It is a saver of time, although it requires quite as much thoroughness as any other filling.

(7) It is more compatible with tooth-structure, causing less thermal irritation.

In closing, I would say that for the last three years we have almost wholly used the method described; in fact, we

have had occasion to use the mallet but little during that period of time, and in many cases only to test the density of certain fillings and to be more thoroughly convinced that a solid filling was produced. We are more and more realizing the great belief which is afforded to the patient by being freed from the blows of the mallet, and the consequent satisfaction to the operator. During these three years we have had opportunity to observe many of the fillings inserted by this method, and we are more and more convinced that it is an excellent one.

As we so largely depend upon the cohesive properties of the gold in this method of filling, and as we make an adhesive filling by the use of the cement, it is suggested that we term it the "cold" method of filling.

Dr. C. EDSON ABBOTT, Franklin, Mass.
"Alcohol and Asbestos Investment."

This is an investment for holding during soldering small bridges, Richmond crowns, orthodontia apparatus, gold inlay matrices, posts and caps, etc.

The pieces to be soldered are waxed together as usual, whiting in water being painted on the facings and where solder is not desired, and invested in alcohol and long-fiber asbestos as supplied by hardware stores or plumbing establishments, the whole resting on a small tray of nickel or platinum. A match is touched to the alcohol, and when it is entirely burnt off powdered borax is sprinkled on the joints and the case is ready for soldering. By this method all moisture and wax is burned off, and the parts are held accurately. The porous investment allows the blowpipe flame to heat up the case quickly from underneath. Being equally heated the solder flows like water to a perfect rounded contour. The case is allowed to stand until it is cold. This method produces ideal results, with a great saving of time in waiting, in soldering, and in finishing, with no cracked facings.

Dr. N. A. STANLEY, New Bedford, Mass. "Treatment of a Case of Pyorrhea by Using the Carr Instruments."

Dr. Stanley operated upon a practical case of pyorrhea, a few of the teeth having been previously treated, and clearly showed the results to be obtained from this first and most essential step in the treatment of pyorrhea, viz, a thorough scaling.

Dr. W. H. MITCHELL, Bayonne, N. J.
"Vibration and Dental Massage."

By means of a simple device and of a few special instruments, Dr. Mitchell demonstrated on a patient his method of utilizing the benefits of vibration and massage treatment in dental troubles where such treatment is advised or where it would prove beneficial.

A small metallic disk out of balance is placed in the handpiece of the dental engine, and the handpiece is held well back and firmly in the hand by a strap passing over the back of the hand. This leaves the hand and the fingers free, while the engine imparts a high degree of vibration to the hand itself. A series of small rubber terminals is mounted on disk mandrels bent at right angles for convenience and used in the engine bit-holder. The fingers being free, the hand can be employed in the use of any instrument, but at the same time the hand being in vibration imparts that vibration to the instrument and to the part under treatment.

Although small and especially adapted for use inside the mouth, this imparts, if necessary, as heavy a vibration as the large machines used for general massage treatment.

Dr. Mitchell reports good results in his own practice for the past two years. By the stimulation and re-establishment of arterial and lymphatic circulation, both in the face and in the mouth, he has been able to arrest many cases of threatening alveolar abscess, and to hasten a cure even after pus had formed. The massage treatment is of great value if the tissues are so sensitive that they cannot be touched by the hand. The hand by means of vibration can gently massage the tissues without causing pain to the patient.

This method can also be used as an

after-treatment in cases of pyorrhea; the gum tissue soon becomes firm and healthy. It is especially indicated in bleeding of the gums following the use of the tooth-brush by the patient. Three treatments of from ten to fifteen minutes' duration generally effect a cure, especially if the patient makes daily use of the rubber tooth-brush after having applied the standard brush.

As for the literature on this subject, an able but long-forgotten paper of the late Dr. Wm. H. Rehfuss has been published in the *International Dental Journal*, another one by Dr. H. J. Allen in the *DENTAL COSMOS* for March 1907, p. 305; another by Dr. A. W. Harlan in the same number of the *COSMOS*, p. 281, and one by the author himself in the *Dental Brief* for April 1908, p. 204.

The clinician presents to the profession a simple device that enables any practitioner to utilize any type of dental engine for giving his patients the benefits to be derived from this modern and approved treatment.

Dr. WM. E. CHENERY, Boston, Mass.
"Oral Surgery."

Of late years much attention has been given to mouth-breathing. Its effects have been studied not only by the rhinologist but by the dentist, and it has been justly found to be the wide-open door to many diseases.

To the dentist, persistent mouth-breathing means in adolescence deformed dental arch and irregular teeth, the opportunity of harboring multitudes of bacteria favoring the people's disease—dental caries—and inviting tuberculosis and gastric disorders.

The rhinologist thinks of the perverted air-current and its bad effects. The inspired air in passing through the normal nose is strained from dust and bacteria, is warmed and moistened, and after having been thus purified is prepared for entering the trachea and lungs without causing irritation. This is very imperfectly done when the air passes through the mouth. Persistent mouth-breathing causes dulled sense of smell and taste, interference with hearing and often

deafness, changes in the quality of the voice, and frequently catarrhal conditions. Lack of drainage and ventilation of the nose also means increased irritation and opportunity for infection. There is also interference with proper oxygenation. In fact, good health and facial beauty demand a normal nose rightly used at all times.

The most frequent causes of mouth-breathing are as follows: (1) adenoids, (2) enlarged tonsils, (3) deviated septa, (4) hypertrophied turbinates, and (5) polypi; and we should always remember habit as a cause, if these obstructions have been removed. I believe all dentists should have a good working knowledge of these conditions, and a closer relationship between dentist and rhinologist is desirable. Today we shall consider adenoids, and tomorrow the other subjects referred to.

In my clinic at the Boston Dispensary I have recently examined the records of 3000 children under fifteen, and I find the book diagnosis entered in nearly sixty-five per cent. to be adenoids or adenoids and enlarged tonsils. Ballenger says it has been estimated that adenoids are present in children otherwise normal in from one to nine per cent. of the cases examined. Sill says that twenty to twenty-five per cent. of children in his general clinic have adenoids or have had them removed. In deaf-mutes the percentage is much larger—fifty to seventy-five per cent. Seventy-five per cent. of ear troubles are due to adenoids. Kyle says that ninety per cent. of patients having adenoids have some degree of deafness. Woakes says ninety-five per cent., Dench that more than half show trouble with the ear. In a series of 120 cases, twenty-six had lung troubles.

It is estimated that eighty-four per cent. of chronic nasal diseases are due to adenoids. According to Wells, adenoids constitute eighty-eight per cent. of all affections of the vault of the pharynx and twenty-five per cent. of all diseases of the upper throat, generally including the fauces. Faught states that the high contracted arch and respiratory obstruction are coincident in about forty-three

per cent. of the cases. I feel sure that if a more careful examination were made this would be found in nearly all the cases.

The cause of respiratory obstruction which leads to mouth-breathing in children and to irregular dentition is pre-eminently adenoids.

In 1876, Joseph Meyer of Copenhagen first described this condition, and to him the world owes much for improved health and longevity.

Holt says, speaking of adenoids: "It is a very common condition and one very much neglected by the general practitioner. It is the source of more discomfort and the origin of more minor ailments than almost any other pathological condition in children."

Adenoids are hypertrophied lymph glands situated at the upper and posterior part of the naso-pharynx or, as we often say, the vault of the pharynx. Lymphoid tissue should normally exist in the post-nasal space, but by irritation, inflammation, and infection this velvety tissue becomes chronically enlarged and so materially obstructs the normal air-current. The smaller the naso-pharynx the more it obstructs if hypertrophied. At the sides of the vault are the internal openings of the Eustachian tubes, and just posterior the fossæ of Rosenmüller are situated. Adenoids often extend into this space and by closer relationship become a great source of danger to the Eustachian tubes and the ears. Heredity and climate seem to have little effect as a cause of adenoids. The family nose may be a factor. Sex makes no difference. Scheppegegrell reports six and one-half per cent. of negroes in the total cases of adenoids in his clinic. The negro has broad, open nostrils, and therefore he has less actual obstruction from adenoids.

The presence of adenoids can often be traced to an attack of influenza, scarlet fever, measles, or some other of the children's diseases. Infection of the lymphoid and epithelial tissue is more apt to occur in childhood, for it is soft and friable and therefore susceptible. Adenoids may be found soon after birth.

The period in which they are most frequently found is from three to twelve years. There is a tendency for atrophy to occur in adolescence at about fifteen, but this is by no means to be depended upon, as I have often operated on adults, and recently on a man of forty-two with large, soft adenoids.

SYMPTOMS.

We may have snuffles, frequent head colds requiring mouth-breathing, which is usually noisy; sleep is restless, often night terrors and enuresis are associated. With development we find the narrow pinched face and slit-like nostril, the alæ collapsing from non-use; the lips are parted, the upper lip becomes foreshortened and the upper central incisors are shown with a tendency to crowd together or overlap with the V-shaped instead of the dome-shaped arch, and consequently with dental irregularity. The bridge of the nose thickens and there is a general listless, stupid expression to the face. Earache and dulness of hearing are frequent. Aproxia or inability to learn or fix the attention is common. The child is apt to be pale, under-developed, narrow-chested, or with actual chicken breast. Epilepsy and chorea are often brought on by the presence of adenoids.

Clinical observation shows that if a child is going to have adenoids he will have them before eight years of age; between five and eight is the most prevalent period, and this is the time when they do the most harm in disturbing the second dentition.

There is no use in temporizing with medicine or waiting, because there is a tendency to atrophy at the age of fifteen. Irreparable harm may be done; and certainly nothing is gained. Operation is advisable in all cases where adenoids cause interference with nasal respiration, and especially if the ears are affected. An operation should be made early, before eight years. Occasionally the adenoids recur, but if a thorough operation is performed, and the sides of the fossæ of Rosenmüller are thoroughly curetted, recurrence is rare. Large ton-

sils should be removed at the same operation, usually before the adenoids.

There is a tendency to refer cases of irregular teeth to the orthodontist. The busy practitioner has no time for orthodontia. This is all right when the irregularities are pronounced and need much attention, but this is an age of preventive medicine, and whenever irregularity is due to mouth-breathing, it can and should be avoided. Parents are learning the necessity of caring for children's teeth early, and it is the dentist more than the family physician who is responsible for the form of the mouth and face, and for the proper eruption of the teeth during the plastic stage—seven to fourteen—when the bony framework of the face is easily molded. In the deciduous dentition irregular teeth are rarely found, and the first permanent molars are generally erupted regularly, but with the second dentition the trouble generally begins. The first molars should be preserved as long as possible. The dentist should see the patient early, and should detect the presence of that which will cause trouble in a few years, and advise operation. If any obstruction to nasal breathing is removed early, and the mouth-breathing habit is corrected, the superior maxillary bones will develop as they should, the arch will be dome-shaped, the teeth regular, and the occlusion usually perfect. Thumb-sucking and rubber nipples should never be allowed.

Remember the time for operating in order to avoid any deformity is during the plastic stage of the bones of the face. Mouth-breathing becomes almost a necessity even though the obstruction may be removed after the facial bones are molded rigidly into the high V-shaped arch. The danger from the operation in the hands of a skilled operator is very small when compared with the improvement in health. Ether is by far the safest anesthetic. The position for operating depends on the operator.

Finally, let me lay down this rule: Any condition in the nose or upper throat which interferes with the proper passage of air through the nose is a menace

to good health. Ventilation and drainage of the upper air-passages must be maintained at all times. A patient is never too young for correction of bad habits, but often too old. Bad habits mean mouth-breathing, which is the cause of the vast majority of dental irregularities. By early removing the adenoid or nasal obstruction—before six or eight—making possible the correction of the mouth-breathing habit, the need of orthodontia will be largely avoided, and the work will be better and more easily done. The health of the patient will be improved, his power of resistance will be increased, and his life will be prolonged.

Dr. TIMOTHY LEARY, Boston, Mass. "Laboratory Exhibit.—The Common Bacteria of the Oral Cavity, and Lesions Arising Therefrom."

The exhibit of this department on the "Bacteriology of the Mouth" consisted of cultures and microscopical demonstration of smears and lesions produced by the common mouth-bacteria.

PYOGENIC BACTERIA.

(1) *Pyogenic staphylococci*. Cultures of staphylococcus pyogenes aureus, albus, and citreus. Smears from cultures. Sections showing organisms in skin abscess (local infection) and heart abscess (general infection—pyemia).

(2) *Streptococcus pyogenes*. Cultures on milk-agar and on blood-agar (to show hemolysis). Smears from cultures. Section of lung showing organisms in streptococcus broncho-pneumonia.

(3) *Pneumococcus*. Cultures on blood serum and blood-agar. Smears from cultures. Section of lung showing bacteria in lobar pneumonia.

(4) *Bacillus mucosus capsulatus*. Cultures on agar. Smear from culture. Section of lung showing capsulated bacilli in lobar pneumonia (Friedländer's type).

(5) *Diphtheria bacillus*. Cultures on blood serum. Smear from culture. Section of trachea showing organisms in pseudo-membrane.

(6) *Bacillus aerogenes capsulatus*. Culture on blood-agar to show extreme

type of hemolysis. Smear from culture. Section of lung to show organisms in circulating blood.

(7) *Tubercle bacillus*. Cultures in glycerin bouillon and agar. Smears from culture. Section of lung to show almost pure culture of bacteria in walls of lung cavity.

(8) *Typhoid bacillus*. Cultures on bouillon and agar. Smears to show flagella. Preparation to show Widal test.

(9) *Fusiform bacillus*. Cultures in blood-agar — noma — anaerobic plate. Smears from dirty mouth to show spirilla. Smears from pyorrhea pockets to show predominance of spirilla. Smears from noma to show bacillary and spirillum forms. Smears from Vincent's angina to show both forms. Sections from tissue in two cases of noma to show felt-like masses of bacteria invading and destroying tissues.

(10) *Spirochæta pallida*. Smears from chancre of the lip and buccal mucous patches to show spirochætæ.

(11) *Cultures of pigment-producing bacteria*.

(12) Plate cultures from clean and dirty mouths. A series of six cultures from clean and dirty mouths for contrast. Plates made under identical conditions from unprepared mouths, the dirty mouth showing about twenty times the number of colonies obtained from the clean mouth. Plates on blood-agar showing the possibility of cultivating by this method many varieties of bacteria which will not grow on other media. Anaerobic plates to show method of anaerobic plate culture with Leary jar.

Dr. G. V. N. DEARBORN, Boston, Mass.
"Physiology Exhibit."

The physiological demonstrations were given in two of the rooms of the physiological laboratory on the ground floor of Tufts College Dental School, and attracted a large number of visitors. The exhibition was intended to show both a few familiar vital processes and the methods of modern teaching in the laboratory. There were two demonstra-

tions of the actual blood circulation as it is to be seen in the frog's foot. The shape, color, and relative number of the blood corpuscles and the speed of the current through the arterioles and capillaries were readily to be seen under the compound microscope. Another arrangement of apparatus exhibited the action of the mitral and tricuspid valves of the heart of the ox. An electric lamp inserted in the left ventricle allowed the valve action to be clearly seen.

The small and transparent crustacean *Daphnia* exhibited in a valuable way all of the basal processes at once. One could see the circulating blood and the beat of the simple heart by which it is kept in motion. Digestion was epitomized in the pulsating digestive gland and in the peristalsis of the conspicuous intestine. Respiration was seen in the rapidly moving gills attached to the feet. Embryos in various stages of development were obvious in the brood-sac. Eye movements could be studied and various matters concerned with the action of muscles in the eyes and in the vigorous antennæ.

The other demonstrations showed the methods illustrating other processes in the hearts of the frog and tortoise, especially the tonus of the heart, which is probably of great importance in adapting the action of this organ to the essential vaso-motor changes elsewhere in the body. The method of studying the respiration movements was shown in the Florida chameleon and in man. Another mechanism demonstrated by means of Cannon's method with the zoetrope the peristaltic and segmenting movements of the cat's stomach and the small and large intestines.

Altogether, Professor Dearborn and some of his assistants gave a striking and instructive suggestion of some of the routine work done in an up-to-date physiological laboratory. The importance of such knowledge to the student of dentistry is frequently ill appreciated even by the practitioner, especially if his education was obtained before the modern method of instruction was adopted by the dental schools.

NATIONAL DENTAL ASSOCIATION—SOUTHERN BRANCH.

Eleventh Annual Meeting, held at Birmingham, Alabama,
May 12, 13, and 14, 1908.

(Continued from vol. 1, page 1417.)

THE next order of business was the reading of a paper by Dr. H. T. STEWART, Memphis, Tenn., on "Riggs' Disease Yesterday, Today, and Tomorrow," as follows:

RIGGS' DISEASE YESTERDAY, TODAY, AND
TOMORROW.

I quote from a paper which I read in 1896: "It is hard to say anything on Riggs' disease that has not been said a hundred times before. In all the field of dental literature there is no topic so much discussed—no subject so threadbare.

"We hear it at every chance meeting with a brother dentist; we have listened to it at every association we ever attended in our lives, and we see in almost every number of every journal that is published somebody's theory as to its cause and somebody's suggestion for its cure. So much has been written from which we are able to glean no real knowledge; so much has been said that is only a repetition of what we have impatiently listened to since our earliest recollection; there have been given us ideas and remedies of so many men who, after stating all they know, end up by virtually admitting: 'I do not know its cause, I cannot effect its cure,' that it is usually with absolute indifference or ill-disguised impatience that we listen to a paper on this nightmare of the dental profession."

I quote from Dr. William H. Truman, who in the same year (1896) in reviewing the literature of more than a century, has given us so concise a his-

tory of the manner in which the profession have dealt with this disease that I cannot refrain from citing at length in his own exquisite language. He says:

"Dr. Junius Cravens now recommends a procedure very closely resembling that advocated by Thomas Berdmore, a distinguished dentist of London, in a work he published in 1770; so closely, indeed, that we are tempted to ask: Have we, in the intervening century and a quarter, simply swung round in a circle? Berdmore in 1770 says: 'The treatment is partly medical and partly surgical. The former consists in removing the original disease of the whole body by a due course of medicine, and in washing the mouth frequently with antiseptic and astringent liquors, rendered slightly acid by means of orange, lemon, or sorrel juice, or vinegar. The surgical treatment consists in scarifying and pricking the affected gums, and destroying their tender outer skin in such a manner as to occasion a fresh shooting forth and elongation of their substance, and such a solidity as will endure the usual impressions of mastication. When the gums have lost their connection with the teeth, or when they do not embrace them closely, cutting a small slip away from the fore part is of considerable service, for the new gum will then adhere to the tooth, or at least it will embrace it more closely.'

"He recognizes the importance of first cleansing the teeth of all deposits, and states that the scarifying or cutting of the gum may have to be frequently repeated. Berdmore claims that when the patient will submit to the necessary treatment and follow closely his direc-

tions, the surgeon-dentist will seldom fail of success in cases of this kind.

"This close identity of the late suggested treatment of pyorrhea and that in vogue so long ago is quite suggestive, and well deserves your careful attention. I say in vogue so long ago, for Berdmore does not claim this treatment as his; indeed it seems to have been the common practice long before his advent into the dental world. Unanimity of experience in treating this disorder seems to have been, in that day as in this, sadly wanting. Robert Woofendale, writing in 1783, referring to the treatment recommended by Berdmore and to the case Berdmore especially reports, says: 'Such cases I have frequently seen, but never cured one, nor have I seen one of the same kind or anything like it cured by any other person.' He further says: 'Lancing the gums to prevent the scurvy in them is with some people a fashionable operation, which they have performed regularly, some once a month, some once a week, or oftener, supposing that it will prevent or remove all complaints of the gums, teeth, and their connections. By observation, however, this operation performed in such a manner by no means proves such expectations well founded. The operation, frequently repeated, may be lucrative to the operator, but in my humble opinion is of little, if any, advantage to the teeth or gums of the patient.'

"Robert Woofendale was a student of Thomas Berdmore. I note here and there throughout his book a disposition to give his preceptor a sly rap now and again. I note, also, in dental literature of recent date, that this disposition is still manifested by some of our profession who fail to see matters in the same way their brethren do. I still further note that this disposition at times is a serious clog to real progress, in that it provokes antagonism, fosters an un-receptive spirit, and prevents a bringing together, careful sifting, and equitable comparison of our varied experiences, by which process alone can they be made practically useful. Berdmore considered this disorder curable, even when it had

far progressed, and claimed as part of the cure a reproduction of lost tissue. Woofendale claimed that it is usually curable, so long as there remained, embedding the roots of the teeth, enough tooth-supporting tissue to securely hold them. He contends that to restore to health the disordered tissues is all that can be expected, and both agree that to retain them in this condition requires constant care and continued watchfulness on the part of the patient.

"Woofendale further says, and this with emphasis: 'When the exposure of the root is occasioned by accident, as a bruise, a cut, or the like, it will frequently be restored by nature, generally without the assistance of art, but when the smallest part of the roots of the teeth are exposed, in consequence of the adhesion of tartar on them, by the scurvy in the gums, venereal infection, or the imprudent use of mercury, I never saw the least disposition of the gum to grow to the teeth, although assisted by scarification, or by stimulating, balsamic, astringent, or other sort of washes or applications; the gums would as soon grow to a piece of ivory or iron as to the root of a tooth which has lost its periosteum from any of the causes here alluded to.'

"Jourdain writes dolefully of this disorder, and says: 'Those who think they have made cures by scarifications, etc., by cautery, issues, and the like, have confounded this with suppurative fungus of the gums alone. I have seen many cases treated by these so-called successful remedies, and I may safely say I have yet to see the first cure performed.'

"How very like the remarks in reported discussions on this subject in this year of grace are these, culled from writers of more than a century ago, writers who were well conversant with, and who have actually described this and other allied disorders of the teeth and gums that in their day, as in ours, in spite of their efforts and in spite of our efforts, result in a much-to-be-deplored tooth-loss. With them, as with us, whether these disorders were merely local or were wholly or in part systemic was

a much-debated question; indeed, a careful study of the accurate and full records they have left us makes one ponder and prompts the question: What do we know of these disorders that they did not know?"

Dr. Truman further says:

"Most earnestly would I urge upon those making a special study of this and allied disorders a thorough research and careful study of its literature. I question if any department of our art has been more carefully studied or more fully written up than have been the disorders and diseases of the tissues surrounding the teeth. Fauchard, Ricci, and other able writers and observers made of the disease of the gums and teeth a careful study. They visited the hospitals, and in conference with physicians and surgeons earnestly and zealously labored to master the same conditions that confront and baffle us today. Many writers of today, giving the results of their recent studies in this field, would probably be astonished were they to see their productions in parallel column with those of Bourdet, Jourdain, and many others who lived and labored before the present century began. When a writer expresses the opinion that this disorder is becoming increasingly frequent, that it is the outcome of modern ways of living, that it is largely more prevalent as the result of imperfectly performed dental operations, I wonder if he knows that more than a century ago it was so prevalent, so intractable to treatment, so prolific of tooth-loss, that the dentists of that day, discouraged and disheartened, labeled it *devastation of the teeth*.

"Of it Dr. H. H. Hayden, writing in 1822, has this to say: 'This disease, from the nature and extent of its ravages, as great or more so among the opulent and rich as among the poorer classes of society, has at different times engaged the attention of some of the most skilful physicians, as well as professional dentists, in Europe; and in the course of treatment which they have pursued they have severally resorted to every means for its cure that medical skill

could suggest—emollient, astringent, and detergent gargles of various kinds; astringent, tonic, and antiseptic elixirs; mercurial washes, absorbent powders, aromatic pastes, electuaries, alteratives, sedatives, venesections, vesicatories, injections, setons, issues, excision of the diseased parts, scraping the diseased bones, repeated applications of the actual and potential cautery, etc.—notwithstanding which, their efforts have proved ineffectual.'

"Some of the older writers have observed that persons subject to gout or rheumatism were seldom afflicted with this disease; on the contrary, those afflicted with the suppuration of the gums are seldom troubled with gout or rheumatism, while recent writers contend that gout, rheumatism, and pyorrhea have a common origin and are frequently associated. From the earliest mention of this disorder to the present hour, our profession has been quite unsettled regarding it, and as a natural result, much time and labor have been expended in rehabilitating discarded theories or in the effort to supplant one unsatisfactory theory by another equally at variance with observed facts. Fauchard was inclined to reject the theory that certain diseased conditions of the system were the cause of it, because he had frequently seen cases where the systemic diseases were well marked and the trouble did not exist; and also from having observed the converse of this, cases where this trouble was well marked and no disease was present; and the further observation that remedies suited to these diseases had no effect whatever upon the oral trouble. He regarded the coexistence of the two as a mere accident, and was more firmly inclined to this opinion from having frequently observed that in such cases, while the systemic trouble readily yielded to appropriate remedies, there was no corresponding improvement in the oral lesion. Systemic treatment, he was impressed, was of little avail. Precisely the same statements have been made at a very recent date, and while not universally accepted, I am impressed that Fauchard's position in this matter

is substantially that of the masses of the profession at this time."

The above quotations are from a paper written in 1896. One might think that since the recent wave of modern prophylaxis has swept over the profession, Dr. Trueman had certainly changed his mind, but listen to what he says in 1908 in regard to this so-called filth disease: He says: "In reference to this matter, are we not at a standstill? Papers are being read upon it in rapid succession, the pages of our journals are full of it, but are we advancing? I show you a copy of the business card of Dr. William H. Atkinson, who therein claims to have mastered the treatment of pyorrhea about 1840, and he offers to teach how it can be done. A little later Dr. Riggs defined the pathological conditions associated with pyorrhea from his viewpoint, and he, too, successfully treated the disorder, and for some time the profession was busy vigorously chiseling at supposed necrosed alveolar borders. Now we are getting back to Dr. Atkinson's ideas, with some little changes, to make them comport with the modern suggestion that it is a 'filth disease' whatever that may be. Is this progress? What is filth? How does it come to be in the oral cavity? Is a periodic raking it up and washing it out the best the profession can do for the patient? This brings us to a question on which the whole matter depends, namely, Is it normal for a human being in civilized life to have a filthy mouth? If it is, then the dental scavenger is legitimately on the program and to minimize the evils of this filth is the right thing to do. If it is not normal, then it is up to the profession to seek the cause back of it, the cause of its presence, and to accept this dental prophylaxis as a mere temporizing. To exalt it to a solution of the trouble is not to the credit of the profession."

A paper on this subject was read by Dr. Kirk a few months ago, in which he took the ground that it was not normal for these conditions to be present, that treatment should not be merely mechanical, and should be directed not to their

presence but to the cause of their presence. It had the right ring. Getting at the real cause is today the trend of medical science; we need more of it, a great deal more of it, in the dental profession. It may be that we will find that many of these disorders of the soft tissue of the oral cavity are filth diseases, but unless the more recent research is at fault, the filth will be found to be located yards away from where dental prophylaxists have been so long pottering and in close proximity to the anus, surrounded on all sides by absorbent glands that are taking up and distributing throughout the system the toxins which are generated by a mass of putrid filth located there.

Now, I ask, Why is all this? Why have we made so little real advancement in the treatment of this dread disease as compared with the rapid strides made in the mechanics of dentistry? Why is it that so many dentists pay practically no attention to the treatment of this trouble? Why is it that the majority of dentists never notice that their patients have Riggs' disease until there are some very decided symptoms, receding of the gums, very deep pockets, or loosening of the teeth. Oftentimes these men never notice it or look for it until it has progressed to such an extent that the patients themselves call the dentist's attention to it. Why is it that as a rule, even when treatment is attempted, it is done in a half-hearted sort of way, and oftentimes only at the earnest insistence of the patient? Why is it that the treatment is usually unsatisfactory to both patient and dentist, and that the disease is very rarely controlled?

We have progressed step by step in other lines, taking here and there every little suggestion given, and working up to a more complete method, until we have reached a wonderful degree of perfection. But in the treatment of Riggs' disease we have spasmodically started up every once in a while, for several generations, have applied ourselves to it for a short while, and unconsciously drifted away into the art and mechanism of restoring lost tooth-structure.

When Dr. John M. Riggs gave to the profession his unique set of instruments and demonstrated the results that he obtained, there was a great stir among dentists; many procured a set of his instruments and began to operate, expecting the same results. The instruments soon fell into comparative disuse and the profession devoted itself to filling teeth with gold, and Riggs' disease was as incurable as before. When Fauchard gave his views to the profession and outlined a treatment over one hundred years before Dr. Riggs' time, the history of the way in which the profession received it enthusiastically and did nothing with it is the same. This was no doubt repeated several times between the time of Fauchard and Riggs, and it has been repeated more than once within our own time. When Dr. Ingersoll advanced the sanguinary calculus theory, enthusiasm again manifested itself, and gradually died away. When Reese and Pierce came forward with the uric acid theory, a new interest was manifested, and we relapsed as usual into indifference. When Dr. George Clements showed us the hypercalcification of the cementum, we stirred a little in our sleep, but we did not even open our eyes.

Dr. Younger demonstrated to the satisfaction of many that with his ingeniously devised instruments he obtained really wonderful results, and there was another break in the calm that ruffled the waters considerably, but Dr. Younger and his accomplishments were soon drowned by the great waves of crown and bridge work and extension for prevention.

Now comes our great apostle of modern prophylaxis, Dr. D. D. Smith. And I want to take off my hat to this good man, and thank him for the good he has done to humanity. His ideas have perhaps excited more general interest and his methods have been adopted by a far greater number of dentists than have those of any other man, and, for a time at least, more good to the greatest number has been the result. But even now we find that the interest is lagging. Men have been looking for some easy way

to cure Riggs' disease. Dr. Smith's idea of keeping the teeth clean seemed, at least, to promise an easy way. But practitioners are finding it not as easy as it seemed, and Dr. Smith's voice is becoming fainter and fainter amid the roar of porcelain fillings and gold inlays. It is the old story that has long repeated itself, and will ever repeat itself until conditions radically change. It has become so fixed in our minds that the disease is incurable that many of us will listen to nothing else. A man may be ever so conscientious and may actually produce good results, yet we will not believe. We indifferently try what he advocates, fail, and throw it aside. We utterly fail to grasp the fact that the man must do *something*, that he must have *some point* that is of use, that he produces a result that at least encourages *him*. This is a point to which I wish to call your attention, viz, that these men have something that in their hands produces some good results, and that if we can grasp that something and use it as they do, it will produce results for us. But if we fail to be able to use that something as he does, we must not conclude at once that this something is nothing.

I hold that our failure to advance along these lines is largely due to our failure to systematize what these men have done and to gradually work out a more complete way. Dr. Smith accomplishes wonderful results by handling the porte polisher; very few others can do the same thing. We cannot all work alike. Dr. Riggs could not have succeeded with the instruments of Dr. Younger, nor could Dr. Younger accomplish what he has done by Dr. Smith's methods. You and I could not take Dr. Smith's methods and instruments and do what he has done, nor could he succeed with Riggs' or Younger's methods. Yet no one will say that because we cannot use Dr. Riggs' instruments, *he* did not accomplish results, for eye-witnesses state that the results were marvelous. He used these instruments as no one has been able to use them since. We take up one man's method

and try it indifferently, fail, discard it, and take up another and another, and fail in all. At least we get such indifferent results that the disposition is to practically abandon all and confine our efforts to mechanical operations and gradually cease to put forth any effort whatever to really cure Riggs' disease.

Now, why is this? I claim that we have utterly failed to systematize information that might have been gleaned from the men who from time to time have had considerable success in dealing with this disease. We have either refused to believe that a man has actually obtained these results, or we have utterly failed to perceive just how and why he obtained these results when we ourselves met with partial or complete failure in pursuance of what we thought was his exact manner of treatment. We fail to realize that success is due to the man's peculiar talent and fitness.

Again, because we get a certain result from a certain procedure, we have been too much inclined to refuse to accord to our neighbor the fact that he also gets good results from some other procedure, and that his theory is also largely correct. The local-theory man is too much inclined to assert dogmatically that he gets a cure by local measures, and that it is a local trouble, and that the systemic-theory man is a mere theorist. The systemic-theory man is too much inclined to lay all stress on the systemic conditions, and to refuse to concede the fact that the local-theory man accomplishes as much as he really does accomplish.

Dr. Smith has advocated the local theory so satisfactorily and with such ability that the profession are accepting it, just as they accepted Dr. Peirce's constitutional theory, which is diametrically opposed to it. The golden mean lies between these theories. These men are both right and both wrong; Dr. Peirce in that he assumes that uric acid is the factor that produces the disease, while it really has no more to do with it than has malaria. Uric acid will cause Riggs' disease, but so will malaria. Dr. Smith is wrong in that he gives out the

idea that pyorrhea is purely local. The infection is local, certainly, but due to systemic causes. He himself suggests that it may be caused by foul breath. Why, then, is it not reasonable to treat the constitutional causes as well as the local infection? True, the local infection may often be controlled by close application to the part, but why should we not correct, if possible, the conditions that cause the infectious breath, and so not handicap ourselves? Is this not reasonable? Is it not common sense?

And so, while holding fast to what we have found to be good, let us not fail to lend a helping hand to our neighbor in developing his ideas. If we get good results from local treatment, and our neighbor claims results from systemic treatment, let us combine, if possible, the good parts of our treatment and those of his. Again, if in systemic treatment we are using allopathic remedies, let us not assume that no results are to be obtained from the homeopathic treatment.

If some man of intelligence carries out long and careful investigations and tells us that uric acid causes Riggs' disease, we had better think very carefully before we say that uric acid conditions are no more accountable for the local conditions than is any other systemic disorder; and we should carefully experiment before we assume that the anti-uric acid remedies do more toward curing Riggs' disease in general than an anti-malarial remedy. If some man announces that after long and careful observation he has reached the conclusion that syphilis is more far-reaching in its ultimate results than the profession dreams of, and that he is convinced that it is largely responsible for Riggs' disease, it would be well, before dismissing this as ridiculous, to look deeply and thoughtfully into the matter and to at least remember this in our treatments when all ordinary methods fail. If a careful investigator tells us that a catarrhal condition of the mucous membrane of the nose and throat is continuous in the mouth and greatly affects the pyorrhoeal condition and its treat-

ment, it behooves us to think long and carefully before deciding that we will pay no attention at any time to the throat and nose while combating this disease. If some man, who has had much experience, tells us that coffee is responsible for a very large part of Riggs' disease that exists today, it would be well, before laughing him to scorn, to ask just what effect coffee has on the nervous system of many people, and to what extent it is capable of disturbing perfect metabolism; and then it is worthy of more than a passing thought to remember how many people drink coffee and how often they drink it, and to remember that coffee is usually drunk to stimulate a tired, nervous system and to keep it up at a high pitch at the very time when nature is trying to relax it.

When it is announced to us, after almost incalculable labor and research, that imperfect metabolism or malnutrition is the great causative factor of this disease, we should stand with uncovered heads before such men as Talbot and Kirk, and read, study, investigate, and think almost with reverence before we dogmatically dispose of their view with the sweeping assertion that the disease is as common among our healthy and vigorous patients as it is among those that are enfeebled and run down in health. On the other hand, it is equally dangerous to accept any one man's views *in toto*, and to be wholly satisfied therewith. If we see one man operate skilfully and produce excellent results, we are much inclined to accept not only his method of operating, but also his views as to the etiology of the disease and the pathological condition of the surrounding parts. Again, we read some strong article of an original investigator, one that seems entirely reasonable, and we are inclined to shut out everything else and to entirely accept his views, being satisfied with them. It is true that at times the profession has been so bewildered by the numberless theories advanced that we have been compelled to accept somebody's views that might appeal to us as reasonable, but the time now seems ripe for a more

reasonable and comprehensive systematizing of the knowledge already at our command, and for a more direct and uniform mode of treatment.

In this paper I have no new theory to advance. I have reviewed the past history of this disease in order to make a plea for a concentrated, determined effort to change the conditions that have led us all, as Dr. Trueman says, "to swing round in a circle"—to rid our minds as far as possible of dogmatic tendencies; and that those of us who are specially interested in this disease will with clear, untrammelled judgment concentrate our energies to bring order out of the chaos and bring about a system of treatment that is as direct, as uniform, as intelligent, and as effective as is now our system of restoring tooth-structure, or as is the system of treatment of any of the various specialties of medicine. It is my firm belief that this can be done, but it cannot be done in one day. To this end I would urge the uniting of a few men deeply interested in this object, who would earnestly, patiently, and unselfishly work to this end. Notwithstanding the discouraged tone that runs all through the article from Dr. Trueman's pen, I am convinced that we today are in a position to rapidly advance and to cease to "swing round in a circle." I believe that to accomplish this it is necessary to combine as a body for the cure of Riggs' disease. I believe that it is necessary to concentrate our energies in a powerful effort, but we will not accomplish this in a general dental association. A small body of earnest, intelligent men can combine and form the nucleus from which shall grow a large and efficient association; surely the ultimate good accomplished will be incalculable. May this society be formed, and may it be formed at an early date!

Discussion.

Dr. A. W. PATTON, Tuscaloosa, Ala. I think that this is a very timely subject indeed, and one that I feel that I know very little about. On account of my bad hearing I cannot say anything ex-

cept that I indorse what the essayist has said. As a young practitioner I feel that I knew nothing of pyorrhea yesterday, very little of pyorrhea today, and like the rest of us, I have to guess at what it will be tomorrow. I do think, however, that we are making progress along this line, and I believe that in the course of time we shall have pyorrhea under control. Even now we see evidences that some of the worst cases may be cured.

Dr. J. P. GRAY, Nashville, Tenn. I wish to congratulate Dr. Stewart upon his paper. Although, as has been said, there is nothing particularly new in it, he has given us some good wholesome advice.

I do not agree with him that there should be another organization. We have too many now, but we might make a special section for that subject in our present body. I think that those distinguished men who are devoting their life-work to this subject should do some real research work and show what brings about the disease, in order that the profession may have something to work from. Some men are devoting a great deal of attention to this subject, and some of the operators in this field are empirical in their practice. I believe the day is fast arriving when through the opsonic treatment that is being followed in many diseases we will eventually succeed in finding some positive cure for this trouble. I know of one or two men who have obtained what they claim to be a pronounced success in this work. The mechanical part of course must be carried out along with the other treatment. I believe that pyorrhea finally becomes a constitutional disease, just as much as any other disease. I did not quite understand the essayist with regard to malaria, but my impression is that he spoke of malaria as being connected with this disease. Is that true?

Dr. STEWART. Any disease can cause Riggs' disease.

Dr. GRAY. I do not know about that. I think that by virtue of the fact that the system is reduced to a low state in the performance of its functions the

trouble may be produced. I know that you will find this in a great many, and it is distinctly clear to my mind that wherever fecal matter has been absorbed by the blood, a case of pronounced so-called pyorrhea may arise. You will find then that a certain amount of absorption in the blood has taken place, and you cannot cure that or any other disease as long as this is the case. The blood of people who eat largely nitrogenous foods is absorbing this material, and you will find that this is the case in some of the most robust men who do not have proper elimination and present this disease in a pronounced form. As far as uric acid is concerned, those whom we consider authorities on this subject are convinced that uric acid has little to do with the disease. The correctness of this opinion is fully demonstrated by the chemical analysis of the urine, by which it has been found that only about five per cent. of the cases of pyorrhea present any uric acid whatever. We find in rheumatic troubles that only about five per cent. of the cases have uric acid, even in a small quantity. But we forget that the system is largely charged with an excess of acids of various kinds that accumulate in the system and which must be eliminated before a cure can be effected. I can recall, from visiting the office of Dr. Talbot, who has been making a large number of experiments and has been doing a great amount of research work along this line, that he took up the study of these pyorrhea cases and made urine examination of some four hundred patients affected with this trouble, and found that there was an excess of acid in the blood of from ten to one hundred per cent. I recall two patients belonging to a very wealthy family, a man and wife, who for some six years did not have their teeth, which were in a bad condition. These patients were put on the acid treatment and in the course of a week all the small deposits present were removed; in one patient there was absolutely no deposit at all. I watched these two cases for ten days and there was a marked improvement. The doctor tells me that he has met with great success in his treat-

ment by the elimination of indican from the blood. I believe that the day is coming when the opsonic treatment will be used in the treatment of this disease. But we cannot cure pyorrhea, if a cause for it is present in the system, simply by the removal of the deposits. We may stay its progress for a time, but we must eliminate the cause, and the same treatment will not do for all cases. With all due deference to Dr. Smith's treatment, every dentist knows that if the teeth are kept absolutely clean the disease will not attack them locally. It is therefore absolutely necessary that the dentist should carry out this prophylactic treatment along with the systemic treatment of this disease.

Dr. J. H. CROSSLAND, Montgomery, Ala. I very much enjoyed the able and learned paper read by Dr. Stewart, but there is one statement that I must take exception to, namely, the general idea conveyed by the paper that no noteworthy progress has been made along this line. I was in Memphis a few years ago, and Dr. Stewart was kind enough to show me a number of cases which he treated, and the results which he obtained were marvelous, being entirely beyond what I had believed possible.

There is one thing by which I have been profoundly impressed recently in connection with this subject of Riggs' disease, and that is that there are so many men who stand in abject terror of its presence. I do not wish to be understood as claiming that I am capable of positively curing the disease in all cases, but there is a tremendous percentage of cases which can be reduced to that stage which is generally called a cure, without any very great skill or experience in that line of practice. Many dentists have the habit of examining the patients' mouths and on discovering this disease, of saying that nothing can be done for it. I do not say that the dentist should claim that every case can be cured, but he can assure the patient that he can be greatly benefited. I believe that there are hundreds of cases in which the general practitioner can obtain results that compare very favorably with

the results we obtain in other lines of practice. Indeed, in many cases he can get quite as good results as the specialist does. The periodical treatment as advocated by Dr. D. D. Smith will relieve more cases of that trouble than any other treatment known to us today. I believe the general practitioner can do more good by employing this treatment than by any other method.

Dr. STEWART (closing the discussion). I agree with Dr. Crossland that the average dental practitioner can do a great deal more good than he really does by devoting more attention to prophylaxis. I did not mean to convey the idea that no advance has been made in this line of work; that was merely a quotation from Dr. Trueman to which Dr. Crossland took exception. Some advance has been made, but it is very little compared with the advance that has been made in the mechanics of dentistry. Leaving out the systemic treatment and the various later mechanical appliances, it is extremely doubtful whether any man produces any better results today than Dr. Riggs himself did forty years ago.

Dr. Gray says that we do not need another organization. I have thought on this subject more than Dr. Gray has, and I am convinced that the general dental associations will not make the progress we are looking for in Riggs' disease. My idea is that men especially interested in this line of work should unite in a new organization and devote themselves to the scientific study of this one disease. We could in that way do what Dr. Gray suggests and stimulate original research along this line. I am fully persuaded that the formation of such an organization presents to us the only hope we have of the direct work that we stand so much in need of today. I propose to stimulate the interest in this work, and unless I fail in my determination, this association shall be formed.

Dr. CHACE then presented the following report from the Executive Committee:

Your Executive Committee, to whom has been specially referred the paper of Dr. D. D.

Smith on "Alveolar Pyorrhea," begs to report as follows: After having carefully considered the subject-matter of the paper, we recommend that it be not received.

(Signed) J. E. CHACE,
Temporary Chairman.

On motion the report was adopted.

The next order of business was the report of Section VIII (Appliances and Improvements), by the chairman, Dr. WM. CRENSHAW, Atlanta, Ga., as follows:

REPORT ON APPLIANCES AND IMPROVEMENTS.

The past year has brought forth a number of inventions and improvements in the dental world that are worthy of note. Principal among these is the cast inlay method, which with its various modifications promises to revolutionize in a measure some lines of practice. While primarily intended for the casting of inlays for fillings, its scope has been widened until crown and bridge work of superior construction can be made under this system with economy and accuracy. There are at least a dozen different machines for this purpose. The first and most extensive is that suggested by Dr. Taggart. This outfit involves the use of nitrous oxid to produce the oxyhydrogen flame. The work done with this machine is pronounced by its users to be perfect in every detail.

Another device which performs the same work by an entirely different principle is that known as the Jameson centrifugal. This machine in the hands of expert workers is giving excellent results. The force employed for throwing the melted gold into the matrix is obtained by a rapid rotary motion imparted to revolving arms.

Numerous other small machines, all having the press feature attached, are on the market, and each month new devices appear. We might mention here the Kenyon Compressed-Air Outfit for the same purpose. All of them, however, with the exception of the Jameson, have many features in common, but to describe them and give a detailed report

of their working qualities would involve an essay upon cast inlay work, etc., which is out of the province of this report.

Among the small devices that have appeared since the last meeting we can mention: A new Adjustable Separator. Case's Abrasive Wheels. Little Giant Post Puller. Adapters for Hypodermic Syringes, so as to permit the use of a straight needle at right angles with the syringe. Trigger's Cavity Impression Trays. Translux Cement. Berylite Cement. Hood's Mat Gold. Various forms of Model Wax for use in Inlay Practice. Sterilized Paper-cloth Rolls to be used in the place of Napkins. Black's Amalgam Pluggers, Nos. 1 to 7. Improvements in Angle's Rubber Ligatures. Doriot Handpiece No. 3 and attachments. Black's Finishing Files and Knives. S. S. W. Diamond Chair. Wilson's Ampules. Drying Ovens for Inlay Work. Peritundo, for obtunding sensitive dentin, the preparation to be applied by injecting the gums immediately surrounding the affected tooth. (A special clinic on this preparation will be given at the meeting in Birmingham.)

In furniture for office equipment there have been numerous additions to the list of cabinet and work-benches, many cabinets being now provided with iron safes for the protection of the precious metals so often found in dental offices.

The new books especially pertaining to dentistry and brought out during the past year are—Gilbert's "Notes on Porcelain." Goslee's "Crown and Bridge Work." Turner's "Text-book of Prosthetic Dentistry." Lady's "Questions and Answers." Hewitt's "Anesthesia," new edition. Angle's "Malocclusion," seventh edition. "Practical Dental Metallurgy," by Hodgen, new edition.

In electrics little has been added to the devices in use one year ago. Numerous sterilizers and water-heaters have been placed on the market, and the prices of some of these have been greatly reduced. The S. S. White Dental Mfg. Co. has brought out a new electric furnace combining many excellent features,

and doing away with some objectionable points found in previous models.

The increase in cast inlay work has caused manufacturers to put upon the market pure gold in small ingots convenient for casting purposes:

Dr. CHACE then presented the following resolution from the Executive Committee:

The Executive Committee would recommend the passage of the following resolutions:

RESOLVED, That the Southern Branch request the National Dental Association to change the by-laws with reference to admission of members, so that anyone eligible to membership in the National Association shall be admitted without a delegate certificate; the receipt for dues for the current year from his state association shall be evidence of standing in the state association; and be it further

RESOLVED, That the Southern Branch requests the National body to further change its by-laws so that a member in arrears or suspended for non-payment of dues may be reinstated by the payment of one year's arrearage, together with the current year's dues.

Respectfully submitted,

(Signed) J. E. CHACE,
Temporary Chairman.

Motion made and carried that the above resolutions be adopted.

The meeting then adjourned until 8 o'clock P.M.

WEDNESDAY—*Evening Session.*

The meeting was called to order Wednesday evening, May 13th, by the president, Dr. A. R. Melendy.

The first item on the program for the evening session as announced by the president was a paper by Dr. G. V. I. BROWN, Milwaukee, Wis., on "A Study of the Inter-relation Between Oral, Nasal, Dental, and Facial Deformities with a View to Greater Simplicity of, and a More General Benefit from Orthodontic Procedures."

The President announced as the next item on the program for the evening session a paper by Dr. THOMAS P. HIN-

MAN, Atlanta, Ga., on "A Plea for the Adoption of Orthodontia in the Practice of Every Dentist."

[This paper was printed in full in the November issue of the *Cosmos*, vol. 1, p. 1175.]

Discussion.

Dr. R. C. YOUNG, Anniston, Ala. It is always an honor to discuss a paper or anything else shown by Dr. Hinman, because all that he does he does well and scientifically.

The great difficulty in the correction of irregularities is that the people who practice orthodontia do not realize the fact that teeth move just exactly in the line of the force brought to bear on them. You can move a tooth anywhere, provided you can secure sufficient anchorage.

With regard to the question of taking impressions in orthodontia work, I agree with Dr. Hinman; not that it is more difficult to take impressions with plaster of Paris, but for the reason that the patients—who are invariably children—do not like the plaster impression. A good modeling compound impression is sufficient for all orthodontia cases. Another point in taking impressions is that the ordinary impression tray is not desirable. We want a tray with a flat bottom and with a high ridge. The main object in taking impressions for orthodontia purposes is to get as much of the alveolar process as possible, because this is just as important in correcting irregularities as the teeth themselves. With regard to the methods spoken of by Dr. Hinman, it is simply marvelous what can be done with the intermaxillary anchorage. Anyone who has practiced that method and has had experience with it knows that it seems to move the teeth as if by magic. I do not agree with Dr. Hinman when he says that the making of the Jackson appliances is very simple. It has proved very difficult in my hands.

Someone asked me how to get the solder to flow, and if borax would do it. It will not. A good flux for making the

solder flow can be made by dissolving zinc to saturation in hydrochloric acid and diluting the solution with about one-half pure water. This makes a very useful soldering fluid for all purposes, where soft solder is to be applied.

Another question is that of space. There are three things absolutely necessary to be considered in the practice of orthodontia—first, to get space, second, anchorage, and third, to apply force. The point of anchorage is of much more importance than the point of delivering the force. I have seen men attempt to move a canine tooth in lingual occlusion by anchorage to a bicuspid. The anchorage if not secure will move to the ship, and the ship will go on the rocks and go to wreck.

In regard to some other phases of orthodontia, I had the pleasure a few weeks ago of reading a paper on the subject of mouth-breathing before the Alabama Medical Association. This question of adenoids, gentlemen, is one of greatest importance to the dentist, because, of all the etiological factors in malocclusion, nasal stenosis is the most prolific, not excepting even the premature extraction of teeth or even injudicious extraction. Looking into the posterior part of the mouth we find three sets of tonsils, the lingual, the faucial, and the upper tonsil, or third tonsil, and this is the one that causes all the trouble. These things were not understood until 1868, when a gentleman in Copenhagen first called attention to these growths and named them adenoids. When Pandora opened that box and released the numerous ills of humanity, there was not one so deleterious in its effect upon children as that of adenoids and nasal stenosis. It therefore behooves us to do all that we can to obviate future trouble in overcoming this condition. I have here a model of the mouth of a boy fifteen years of age, and weighing ninety-five pounds, whose mother told me that he had been taken from school because he was unable to learn. The boy had had adenoids, which had been removed last summer, but unfortunately the mischief was already done.

Adenoids and nasal stenosis may occur in infancy and in very young children. I believe that many children are treated for all sorts of ailments, while the trouble is caused simply by adenoids. As the result of this nasal stenosis the child cannot breathe through the nose, because the nose is blocked up, and as a consequence he breathes through the mouth. The mouth cannot perform this function properly, and there is a lack of proper oxygenation; the patient goes on to a state of emaciation, and the physician declares it to be the result of overwork at school. It is not, gentlemen, it is adenoids. Going through the street, you can observe such cases, that have the characteristic pinched appearance around the nose, and it is one of the dentist's duties to call the attention of the parents to these conditions. The child is not responsible for it. If you will call to mind your anatomy, you will remember that the territory occupied by the adenoids is a very narrow space and is easily closed by the growths, consequently an insufficient amount of air passes through the spaces with a subsequent lack of proper nourishment. Nature may accommodate herself to a small amount of air, the same as a man can accommodate himself to a small amount of nutritious matter which may be sufficient to keep him alive but not sufficient for development or repair.

A peculiar observation I have made is how closely the result of this nasal stenosis simulates the habit of cigarette smoking in the young. When I see a boy puffing a cigarette, I feel sorry for him, because I know that he is undergoing a general want of oxygen throughout his whole system. Each cell with its nucleus and nucleolus needs just so much oxygen to keep it going, just as the general structure needs pabulum to build it up. When one is smoking a cigarette he inhales so much smoke that there is a lack of sufficient oxygen, and as a result the tissues and the system are in a narcotic state, and when the mouth is held open, the muscles drag the mandible down and backward. The result of this is a shortening of the mandible from the lack of

proper development, and we have the receding chin. I believe that in the proportion as that chin recedes, a person will have a weak mind. The same cause that arrests the mandibular development arrests the mental. This nasal stenosis results in the lack of the proper development of the nose and face. On each side of the nose we have a maxillary sinus; these require air for their development, and where there are adenoids there is a lack of air and a lack of development.

With regard to the question of occlusion, Angle, that great master-mind in orthodontia, has selected the two first molar teeth, upper and lower, as the guide to occlusion. You can never have a perfect face when you have malocclusion. Why do we take these molars? Simply because they are invariably the teeth that come into proper position at the proper time. One but rarely sees a first molar erupting out of time. Generally speaking, they come into proper place and at the right time, when everything is developing properly. If we stop the development we immediately throw the teeth out of position. Nature has so fixed the teeth that when they close together the jaws are locked and held in the proper relation, and as soon as the teeth are out of occlusion there is a lack of this interdigitation of the cusps, and the incline of the cusps acts contrarily to the normal. Then the upper jaw is pushed forward and the lower jaw backward, with a consequent protrusion of the upper jaw and a receding chin, a deformity that is difficult if not impossible to correct, unless the initial cause be first removed.

These vegetations are so far-reaching in their injurious effect upon the child and through life that the dentist should be on the lookout for them among the little patients under his care, and insist upon their prompt removal.

Dr. J. P. GRAY, Nashville, Tenn. I wish to congratulate Dr. Hinman on his paper. While we do not agree altogether, I want to say that I disagree very much indeed with the gentleman who has just spoken, and cannot allow this

opportunity to pass without giving my views on this subject. I believe in the first place that mouth-breathing causes adenoids. The whole thing is brought about by an arrest of the development of the bones of the superior maxillary, the nose, and the face. You have to have room to breathe. If you close up the septum of the nose, this trouble will be brought about, usually in the first years of the child's life. The arrest of development may have taken place *in utero*, or from the first six months of extra-uterine life to the second or even eighth year. During this period the trouble occurs, and as a result we have mouth-breathing by virtue of the closing of the parts involved, and this is what Dr. Brown is trying to correct when he speaks of spreading the arch. Until we spread the arch so the patient can breathe, we may cut out the adenoids every few months, and they will come back, as a rule.

Dr. E. G. QUATTLEBAUM, Columbia, S. C. There is one point with regard to text-books that I should like to speak of. Dr. Angle takes occlusion as the whole basis of orthodontia, and the essayist recommends both Angle's and Jackson's books on the subject of orthodontia. Dr. Angle's whole work on this subject is based on the one idea that occlusion is the basis of orthodontia. On the other hand, Dr. Jackson does not give a single model calling special attention to occlusion in his whole book. He seems to have entirely overlooked the idea of occlusion. I therefore cannot comprehend why the essayist should recommend both books. For my needs, Angle is all-sufficient; as for Jackson, he does not seem to have any general plan running through his work. It is a description of cases which does not seem to conform with the same ideas as Angle's work, and I think that every man in this audience would profit by securing Angle's book and by reading and studying it.

Dr. HINMAN. I wish to say that no one can understand how to make Jackson's appliances by reading Angle's book, and that is the reason why I recom-

mended Jackson's book. I think the last speaker is very much in error when he says that Dr. Jackson shows no occlusions. My recollection is that he shows many occlusions and calls attention to the use of the intermaxillary force. He showed many models at the Jamestown Exposition with his appliances in place for the proper application of this force.

I should like to call your attention to one thing: There is a young man, who has been with me for about five years, who is going to give a clinic tomorrow on the construction of the Jackson appliance, and I think it would be well for those who are interested in this work to see this clinic. There is no question that you can get rapid and very satisfactory results by the use of Jackson's appliances. Take, for instance, the case which I showed you, in which the arches were carried out into normal alignment in six weeks; if you can show me the same results from any other appliance, I would like to see it.

Dr. G. V. I. BROWN, Milwaukee, Wis. I am very glad to have the opportunity of complimenting Dr. Hinman not only on his paper, but on his manner of presentation and its purpose. If we are to derive the full benefit from this sort of work, there is no question that it must be more generally practiced. We must not simply send cases here and there to someone who has made a specialty of this work, but the general practitioner must have a thorough understanding of its principles. I look upon this subject as upon one that is going to lift the dental profession upon that plane about which we have talked a good deal at this meeting, and I believe that it is going to do so, for one particular reason if for no other. It will not be very long before those who are battling with the "great white plague" will realize that the sum and substance of all they accomplish may be put into just two or three words—more air and better air, more food and better food. That is all that the treatment of consumption amounts to, and if orthodontists cannot secure more air and bet-

ter results from the food than anybody else, I do not know who could. When this subject is understood, as Dr. Hinman has advocated here tonight, by practitioners generally, there will be no doubt as to your position as benefactors of the human race.

As far as the question of adenoids is concerned, I was immensely interested in the two sides of the subject as represented here tonight. In the cases which Dr. Young so eloquently spoke about, we have had a typical train of symptoms wonderfully and perfectly described—the crowded condition with arrested maxillary development, and adenoids forming in a situation where there is not sufficient air and therefore insufficient oxygenation. Undoubtedly this is often a factor in their development, but in reply to a similar question that was recently asked in New York, I called attention to the fact that in cleft-palate cases, which are wide open and where there is improper though not insufficient oxygenation, we almost invariably find adenoids and enlarged tonsils. These are the two sides of this question, each supported by unquestioned, though exactly opposite clinical evidence. We must therefore look beyond for some more primary principle of development, and that is what I have tried to make clear tonight—the principle which from the beginning of the individual's life produces a tendency to irregular cell development, one of the most common manifestations of which is irregular development in the nasopharynx and in the tonsils. Both previous speakers will agree that these enlarged tonsils and adenoids are the result of unhealthful conditions, and that any tendency in this direction may be a causing factor. Where there is a want of oxygenation one finds adenoids because the conditions are unhealthful, and in wide-open palates there is an unhealthful condition because the air is not properly warmed—the air strikes the mucous membrane directly, irritates it on account of it being insufficiently warmed, and produces an unhealthful condition. We have therefore hyper-

trophy of the mucous membrane, and such expressions of this tendency as adenoids and enlarged tonsils.

With regard to orthodontic appliances, I should like to mention that in one respect I think Dr. Jackson's appliances are in a class by themselves, as I have only recently discovered. Dr. Jackson's retention appliance is something that no one can afford to overlook, because it allows the natural movement of the teeth in their sockets. We must have more or less freedom of movement in the adjustment of the teeth during retention, if we wish to have the best results, and in that respect Dr. Jackson's appliance is very good indeed.

Dr. HINMAN (closing the discussion). I have nothing further to add. I just wish to thank the gentlemen who have spoken for their very kind words, and to say that if I have been able to give by this effort any stimulus along the line of orthodontia, I shall feel that my small effort of tonight has been greatly rewarded.

The meeting then adjourned until Thursday afternoon.

THURSDAY—Afternoon Session.

The meeting was called to order at 2 o'clock, Thursday afternoon, May 14th, by the president, Dr. Melendy.

The minutes of the Jamestown business meeting were read by the secretary, Dr. Frink, and approved by the society.

ELECTION OF OFFICERS.

The election of officers resulted as follows:

President—Dr. J. E. Chace, Ocala, Fla.

First Vice-president—Dr. H. Clay Hassell, Tuscaloosa, Ala.

Second Vice-president—Dr. Wm. Wallace, Westmoreland, Columbus, Miss.

Third Vice-president—Charles Logan Gunn, Gadsden, Ala.

Treasurer—Dr. B. D. Brabson, Knoxville, Tenn.

Corresponding Secretary—Dr. W. G. Mason, Tampa, Fla.

Recording Secretary—Dr. Carroll H. Frink, Fernandina, Fla.

Executive Committee—Dr. A. J. Cottrell, Knoxville, Tenn.; Dr. C. L. Alexander, Charlotte, N. C., both for a term of three years.

A telegram of sympathy in the illness of his wife and regrets as to his absence was formulated and ordered to be sent to Dr. V. E. Turner, of Raleigh, N. C.

A vote of thanks was extended to the Alabama Dental Association, to the Local Reception Committee, to the Birmingham hotels, and to others who contributed to the success of the meeting.

A committee of three was appointed to make endeavors for a large attendance of the members of the Southern Branch and delegates from the South to the National Dental Association meeting at Boston, July 28–31, 1908, with the view of a possible steamer trip *en masse* from Savannah, Ga., or some other point.

The following were appointed on this committee: H. Clay Hassell, Tuscaloosa, Ala.; F. L. Hunt, Asheville, N. C.; W. R. Wright, Jackson, Miss.

A special vote of thanks was extended to Dr. Burton Lee Thorpe, St. Louis, Mo., for the excellent lantern entertainment and lecture on dental history. A similar vote of thanks was extended to Dr. G. V. I. Brown of Milwaukee and to St. Vincent's Hospital of Birmingham.

The following resolution was introduced by Dr. GEORGE S. VANN, Gadsden, Ala.:

In order to make definite and effective the recommendation of our president relating to the appointment of a committee of five for the purpose of carrying out a movement which shall insure for the National meeting of 1909 the largest gathering of dentists the world has ever seen, and which recommendation was adopted upon the report of the committee to whom the President's address was referred, therefore be it

RESOLVED, That a committee of five be appointed by the retiring president and the president-elect for the ensuing year, and an amount not exceeding six hundred dollars be

placed at their disposal to defray the legitimate expenses of this work; and be it further

RESOLVED, That the committee have entire charge of the arrangements in planning for and carrying out this recommendation, directing them to work conjointly with the officers of the National Association.

The Secretary was on motion instructed to send the following telegram of sympathy to Dr. J. Y. Crawford, Nashville, Tenn:

The Southern Branch of the National Dental Association and the Alabama Dental Association in convention assembled are deeply cognizant of your absence from our midst and we deeply and sincerely deplore the same. We most sincerely trust that you may soon be completely recovered and that at our next meeting your splendid zeal, learning, and wisdom may enliven and strengthen the tone of our proceedings, and that your genial and manly personality may cheer us as on so many former occasions.

The President appointed the following as the Publication Committee for the ensuing year: Drs. G. S. Tignor, C. L. Alexander, G. S. Vann, and C. H. Frink, recording secretary.

Dr. J. E. Chace, Ocala, Fla., was installed as the newly-elected president, and very feelingly responded to a call for a speech, after which the session adjourned.

The association then adjourned *sine die*.

THE CLINICS.

Dr. C. L. ALEXANDER, Charlotte, N. C.
"Inlays with Moss Fiber Gold."

This clinic demonstrated Dr. Alexander's method of using and solidifying sponge gold, using that form of gold known as moss fiber. The technique as demonstrated was very simple. A piece of moss fiber gold of sufficient size to make a complete operation was detached from his stock gold and molded with the fingers to approximate the form of the cavity or the special work to be made. It was then placed to position upon the tooth and forcibly made to conform to

the cavity or desired shape. The form thus procured was invested in sump, leaving only a pinhead exposure of the gold, over which the solder—22-k.—was placed and fused. The investment was made upon a small piece of paper placed upon a wire-gauze soldering-frame. Heat was applied entirely from below until the solidification was completed, thus avoiding air-pits in the finished work.

By this method the clinician casts simple or complicated inlays, also crowns, hood, and saddle abutments. He uses the same method for backing up porcelain facings, making cusps for crowns, and bridge work, and for setting Logan and other forms of porcelain crowns.

Dr. Alexander demonstrated that his method is a great time-saver as against the matrix and machine castings, and has far-reaching possibilities. Special gold instruments and investment material is being made for this class of work.

Dr. I. N. CARR, Durham, N. C.
"Cast Gold Fillings."

Dr. Carr demonstrated a method of making cast gold inlays, using the Lee machine. He showed how the making of large gold fillings is simplified by the cast gold method, also how he avoids expansion and contraction in making long spans in bridge work, by first carving the dummies in wax, and reproducing them in gold by the use of the machine, putting the cast dummies back on the articulator and having to solder only the two ends to the abutments.

Dr. C. M. BARNWELL, Jr., Atlanta, Ga.
"Cast Gold Inlays."

If two approximo-occlusal cavities in the second bicuspid and the first molar are given, proceed to prepare them for cast gold inlays, as follows: Cut the walls well away buccally, lingually, and cervically. Follow out the fissures and grooves in the occlusal surface and parallel or slightly flare the walls and smooth the margins. Then soften a piece of Taggart's green wax in hot water and press it into the cavities. Have the

patient close his jaws and grind on the wax. This gives the correct occlusion. Trim away the surplus wax and with a thin steel strip separate the fillings. Carve up each filling to the proper contour, always carving from the tooth to the wax, and not from the wax to the tooth. Should the wax become too hard and have a tendency to crumble, flow a little hot water over it from a syringe. Chill the wax and remove it by sticking an explorer into it. Mount the wax model on a sprue-wire by heating the wire and pressing it against the model. Place it in a crucible-former and invest in a small flask. Allow it about fifteen minutes to set, then remove the crucible-former and hold it over a Bunsen burner to dry out. Remove the sprue-wire and heat up until all the wax is driven out.

Then place the investment in the machine with an ingot of gold in the crucible. Turn the blowpipe on it and use about 8 or 10 pounds pressure. When properly melted, bring the lever down, and the cast is made. Saw off the sprue, remove any warts or beads from the underside, and try the inlay in the cavity. Partially polish the inlay and set it with thin cement. Finish the polishing as soon as the cement is set.

Dr. W. R. RENALDS, Salem, Va.
 "Hollow Cast Inlays and Crowns, Anchored to Teeth Without the Use of Pins."

When the Taggart system was introduced I realized that the doctor had given us a good thing. I felt, however, that there was a link missing which I have endeavored to supply, and which others may accept or reject as they may deem proper.

The manner of procedure is as follows: After conforming the wax to the cavity with the proper contour and carving, as is the usual custom for investing, I remove the pattern and embed it in a plaster matrix, allowing the plaster to cover the entire outer surface of the pattern, leaving the cavity side exposed. As soon as the plaster sets it is im-

mersed in ice-water, and the wax is allowed to chill.

With specially devised instruments in the engine handpiece the excavation is made, but before excavating, all moisture should be removed from the wax. The matrix may be held in the hand while making the excavation, though a better method is to rest the matrix on a grooved plate slotted into a rest with a blast of cold air to maintain the chill and to blow away the chips; of this device I am not yet prepared to give an ocular demonstration.

The excavation being satisfactorily made, dip the matrix in tepid water to remove the chill from the marginal rim of the pattern; cut and break away the plaster, remove the pattern, and free it from all plaster particles; return it to the cavity and smooth the edges with burnishers to correct any distortions that might possibly have occurred in the previous manipulations. It is then removed with the sprue-pin and invested.

In investing the pattern, great care is necessary to prevent air-bubbles from forming in the cavity and spoiling the core. This may be obviated by placing investment material in the cavity with a suitable brush, and then blowing out every particle possible, so that all of the surface is covered, when it can be carefully refilled, with the assurance that all is well.

When the proper fit of the inlay has been determined and the inlay is ready for adjustment, make a counter-lock in the tooth-cavity, and when tooth and inlay are cemented together and the cement becomes hard, the result is a key dovetailed into both tooth and inlay.

In making a gold crown, the same method of procedure is followed.

By making an excavation in the stump of the tooth, a short crown may be sufficiently held by the cement key, but if the crown is a long one, pins set in canals projecting into the excavation of the crown would permit of a shallower excavation in the tooth-stump. Where a long crown is required, porcelain set on a cast base is preferable.

My method of constructing such a

crown is as follows: Prepare the stump of the tooth and make a cone-shaped excavation of the desired depth to allow an easy removal of the wax base projection. Roughly shape the wax to enter the excavation in stump and crown, place one end in the stump with the crown over the opposite end and force it to proper occlusion, trim off the protruding edge of the base flange; remove, embed the wax in a plaster matrix, excavate the center of the base, and cast from the crown end, which places the investment core at the bottom of the mold.

The projecting end of the base fitting closely into the excavation in the stump will in many cases be all the anchorage necessary, yet an increased support is obtained by placing a pin or pins in the root-canals projecting into the excavation of the base.

Dr. WM. A. LOVETT, Brewton, Ala. "A Porcelain Crown Made from a Plain Rubber Tooth Backed Up with Porcelain."

The clinician disclaims originality in making crowns by this method, but does not remember to whom it should be credited.

A plain rubber tooth, having platinum pins, is ground to fit the labial aspect of the root. Platinum foil should then be burnished over the root-face, and a platinum pin be made to fit between the tooth-pins. The pins should then be closed together over the end of the root-pin, and held in position by a touch of sticking wax. With the platinum in position over the root, force an opening into the same with the root-pin, carrying it into position with the tooth attached, and holding it by an application of wax. Remove the whole piece including the platinum from the root-end, and invest. Porcelain of the desired shade should then be worked down into the spaces around the pins and shaped to the proper contour by repeated bakings, if necessary. Care must be exercised to avoid air-bubbles, because the porcelain promptly dries on its surface when brought into contact with the invested piece.

This method insures a correct adaptation of the crown to the tooth-root, and its originator claims for it sufficient strength for practical purposes. Personally, I have not given it a thorough test, but I am inclined to believe that it may be employed advantageously in selected cases. A slight shrinkage of the added porcelain may sometimes be noticed at the root contact point, but as this amounts to about one two-thousandth of an inch, the efficiency of the crown is not materially affected.

Dr. GEORGE W. RANDALL, West Blocton, Ala. "The Porcelain Crown."

This was a short, simple plea for a square base as the one which is most quickly executed, the one with which we can most nearly approach perfection, and the one which is the strongest after setting.

The root is prepared after the bulk is removed with a carborundum disk; with a medium grit stone, seven-eighths in diameter by one-eighth in thickness, the anterior portion is ground to a line below the gum margin, then the posterior portion is ground to a point where, if the face of the root be made perfectly square, the pin of the crown will be perpendicular and as nearly a right angle as possible to the face of the root and crown when placed in position.

The face of the crown is prepared by grinding the bulk with the same wheel as the root was ground with, and finishing with a carborundum disk.

This clinic was given for the benefit of young practitioners who are in doubt how to set a crown or who are afraid of a failure after having set what, if properly done, is the strongest and most beautiful crown of all.

Dr. E. G. E. ANDERSON, Knoxville, Tenn. "New Method of Fitting a Porcelain Crown."

The clinician demonstrated a method of mounting Logan fixed or loose-pin crowns, Davis or Richmond crowns, which does away with the band or collar and affords an attachment which is both strong and accurate and not cumbersome or bulky.

The method of procedure is as follows: Prepare the root in the manner usually employed for a porcelain crown with the canal slightly larger than the pin or post, then grind the crown with the labial side of the root and crown in approximate conjunction, grind the crown so as to almost fit the root elsewhere, then grind out a small space from the crown at the lingual side of the crown and root. Place a ball of wax on a pin of sufficient size, press it to place and trim off the surplus wax, chill it, remove, examine and try it in again and see that it is right. Invest the wax and cast with gold. It will be found that the gold has reinforced the post and fills the holes made in the root, and the crown cannot be forced on the root except in the way you intended it to go.

Dr. HOWARD T. STEWART, Memphis, Tenn. "Removable Bridge Work in Cases of Riggs' Disease."

Dr. Stewart presented a very interesting system of removable bridge work, devised by him, and especially adapted for cases of Riggs' disease where a number of the teeth have been lost.

The abutments consist of removable shoulder crowns constructed somewhat as follows: The cap and pin are made as if for an ordinary Richmond crown. An extra floor is then soldered on this cap, leaving the edges extending very slightly. Twenty-two karat solder is then flowed around the band flush with this extension. This is then trimmed and polished. A solid gold "lug" of the proper height for the articulation is then made, with a slot three-fourths of its diameter. This should be a little smaller than the circumference of the cap. After being trimmed and polished, this is soldered to the top of the cap. Then a jacket is formed to fit snugly over this lug and to extend out on the remaining portion of the cap to the edge. Through the side of this jacket, two pieces of clasp metal are carried and made to fit into the slot in the lug and then waxed in position; the jacket and the clasp metal are removed together and the clasp metal is soldered to the jacket. The

two pieces of clasp metal, when spread slightly, form a spring which works in the slot on the lug. Then on the jacket thus formed, the remaining portion of the crown is easily built up to the proper occlusion. We then have a removable shoulder crown, with a spring which holds it firmly in position on the lug. One advantage of this crown being made with a shoulder is that there is absolutely no irritation of the gums.

Dr. Stewart presented quite a number of bridges, showing the various phases of the work. The abutments can be made either with solid gold or with facings by changing the shape of the lug very slightly.

Also, in some cases, where there is an extremely short bite, the clinician advocates the use of a split pin working into a tube in the root and fixed in a very ingenious way into the shoulder crown, which forms an excellent attachment. One bridge he exhibited also showed a method of making a double inlay with this spring attachment for an abutment. These removable abutments seem to be especially adapted for cases where the posterior teeth are all lost. In these cases the clinician forms a removable saddle, which can be taken off and lowered from time to time, as the ridge absorbs, until the ridge be beaten down to a solid foundation.

The clinic demonstrated an exceedingly ingenious and perfect system of removable bridge work.

Dr. T. M. ALLEN, Tampa, Fla. "Cement Inlay Filling."

Dr. Allen demonstrated the use of Dunn's plastic stone material, an inlay cement, in making a permanent filling. The advantages of this material are that tin foil, gold or platinum can be used for a matrix by working the material directly in the tooth, mixing the material like cement and placing it in the matrix on the tooth. It hardens very quickly, and should be shaped up properly with enamel chisels, sandpaper disks, etc., before baking. It can be baked over a Bunsen burner with a blowpipe or in a furnace, and should be carried to a dull

red heat. There is no shrinkage in the baking, and it requires only one baking. The rapidity with which this inlay can be made makes it a very valuable material. Dr. Allen inserted fillings in approximal and crown cavities in a bicuspid and in a labial cavity of a central incisor.

Dr. A. J. COTTRELL, Knoxville, Tenn.
"Bicuspid Restorations."

The necessity for crowning the bicuspid arises perhaps in three-fourths of the cases from the splitting away of either the inner or outer cusp. Owing to the smallness of these roots and the desire to maintain the esthetic as far as possible, it is quite a problem to decide as to the best means of restoration. It is a fact that when one of these walls splits away the remaining one is usually reasonably strong. This demonstration proposes to take advantage of this strength, and by means of an inlay with a pin in the root-canal, to restore the tooth in a way more esthetic and stronger than afforded by any crown yet suggested. The end of the remaining cusp is beveled or slightly scooped out in such a way that the finished piece accurately and firmly engages it. This, with the pin in the root-canal, gives all the strength needed.

If the outer wall be gone, an ordinary facing is fitted, and the whole is finished by soldering or casting. In practical cases these are best made by burnishing a platinum matrix, fitting the pin, soldering and reinforcing, and then taking the impression and bite. Place it on the articulator and adjust from that.

Dr. G. R. LOVELACE, Waycross, Ga.
"A Quick Method of Replacing Teeth on Vulcanite Plates."

This clinic consisted of a method of remounting teeth on vulcanite plates by the use of Melotte's metal. A dovetail is prepared with as large a doll-head at each end as the vulcanite will admit, and dressed with a large inverted cone bur. Adjust the tooth as desired and place the plaster over the labial and grinding edges. Remove all traces of wax with alcohol or chloroform, dry out, flow the

melted metal in, and finish as you would vulcanite. The clinician does not recommend this method in all cases, especially not in thin plates.

Dr. ALICE M. STEEVES, Boston, Mass.
"Mandible Fractured at the Symphysis."

Fractures may occur at almost any point of the jaw, if sufficient force be applied to produce the fracture. Many authorities contend that we never get a fracture at the symphysis, and I have been unable to find any literature on this subject. One case, however, was reported from a New York hospital, and the following case came under my observation:

Fr. G., Scandinavian, aged twelve years, was referred to me by Dr. F. Coolidge. Family history: Tuberculous. Clinical history: Two months previous to applying for treatment the patient was playing on a sidewalk, fell, and struck the tip of her chin on a small stone. Contusion followed, with soreness of the lower central incisors; after a few days the swelling increased, with the formation of pus, pointing on the chin. This was lanced by Dr. Coolidge, a copious discharge of pus following. After a few days the right incisor began to tighten in its socket, but the left remained loose, and pus continued to drain from the opening on the chin. When the patient came under my care, after a careful examination, I found that the probe passed up through a sinus until it came in contact with the root of the left central.

Treatment. The left central was extracted. Crepitus was distinct. Antiseptic precautions were taken, and the carious bone was removed from the sinus with a large engine bur; a packing of iodoform gauze was used, and removed after two days, when a cap splint was cemented to the teeth from first molar to first molar. The wound was dressed with a solution of sulfuric acid every two days for two weeks. At the expiration of two weeks the discharge had ceased and the sinus was completely closed. Two weeks later the splint was removed and the patient discharged.

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PHILADELPHIA, JANUARY 1909.

EDITORIAL DEPARTMENT.

THE DENTAL LESIONS OF SYPHILIS.

SINCE Hutchinson in 1856 first directed attention to certain hypoplastic defects of the hard dental tissues, assigning to them a positive value in the diagnosis of hereditary syphilis, the accuracy of his findings and conclusions has been a much-discussed question. As a matter of fact, it has been the case with Hutchinson's findings and pronouncement as it has been with nearly all new discoveries,—the first presentation did not exhibit the whole truth, and further study and the observation of a larger range of data was necessary in order to place the diagnostic importance of the so-called Hutchinsonian tooth in its proper place and to assign to it the value to which it is fairly entitled.

It is remarkable how little is really known of the characteristic appearances and relationships of the tooth that Hutchinson described as pathognomonic of hereditary syphilis. This ignorance is as pronounced among medical men, even syphilographers, as it is among dental practitioners. It is rare to find a practitioner who can recognize, or one even who thinks he can recognize, the typical Hutchinsonian incisor; much less one who will

undertake to differentiate between a syphilitic dystrophy of the hard dental tissues and one which may be due to other causes. Writers since Hutchinson have done little or no original work in this field, and have been content to quote not only from the text of Hutchinson's classic essay, but to reproduce "unto the third and fourth generation" his original illustrations, which because of the then relatively imperfect state of pictorial art are lacking in photographic accuracy and thereafter have lost much of their original value by the unavoidable faults of subsequent reproduction, so that in many cases the later illustrations are devoid of value in so far as they are intended to represent the dental defect of which Hutchinson wrote.

Those who have expressed views upon the diagnostic value of the Hutchinsonian defect have done so largely upon an academic study of the question rather than from the standpoint of careful original research, with the result that we have had many oracular or *ex-cathedra* opinions rather than sound judgments of a scientific character on this exceedingly important topic. That it is important cannot be seriously questioned when it is considered that much harm may be done by an error of diagnosis in the case of a disorder which usually involves among other things the element of the moral status of the individual, or of the parents of the individual. More than one instance is on record where the diagnosis of syphilitic infection wrongly made has wrought serious consequences to the parties involved and has formed the basis for legal redress for the injuries entailed. It is, however, in certain cases equally important that whatever value the dental dystrophy may have as a means for the diagnosis of syphilis should be utilized, and it is therefore necessary that sound and accurate ideas on this question should be part of the equipment of every practitioner whose work brings him face to face with the fundamental problem here involved.

The poverty of our literature in records of exhaustive studies of the effects of syphilis upon the hard structures of the teeth has led us to welcome the opportunity to publish the excellent work of Dr. Cavallaro on that subject which has appeared serially in the DENTAL COSMOS and which will probably be concluded in our next issue. We know of no author who has investigated the subject so fully in all of its bearings or who has furnished such

an array of cogent reasons, supported by observation of the facts, to support the accuracy and value of Hutchinson's original contention. We think the evidence submitted by Dr. Cavallaro must be considered as conclusively in favor of the decision that syphilis in the parent does produce a characteristic lesion or defect of the dental tissues of the offspring which can leave no doubt as to its etiology. It seems also true that the syphilitic dental dystrophy varies in degree with the intensity of the impress and the time of its action, so that the appearances of the resulting lesion vary somewhat, and it should therefore be studied in connection with other manifestations before the picture is completed to the point at which a definite diagnosis is possible.

Thus far we are in accord with the position of Dr. Cavallaro in his conclusions, but when by the simple device of excluding all other possible interferences with fetal nutrition resulting from intercurrent disease upon the part of the pregnant mother he arrives at the remarkable conclusion that all "cuspal defects" of the first permanent molar must be pathognomonic of syphilis because no other disease can produce said "cuspal defects," we must confess that his argument is not really argument, but special pleading of a pronounced character, as we view it. It is too much like saying, "I have never seen it, therefore it cannot exist." As we read his statement of position, it is, when reduced to its lowest terms, as follows: Syphilis is known to cause cuspal defects of the first permanent molar; no other known disease does produce cuspal defects of the first permanent molar; *ergo*, all cuspal defects of the first permanent molar are caused by syphilis. The argument fails to be convincing because it is not conclusively shown that other diseases—smallpox, scarlet fever, typhoid, or any profound interference with the nutritive processes during gestation—may not also interfere with the nutrition of the dental papilla and its adnexa, and cause dystrophies of the hard dental tissues of the offspring.

Notwithstanding our criticism of the point referred to, we feel that both the dental and medical professions are indebted to Dr. Cavallaro for the painstaking and elaborate research which he has made, and for the great additional light which he has shed upon this comparatively neglected but exceedingly important field of dental pathology.

BIBLIOGRAPHICAL.

ANATOMY, DESCRIPTIVE AND SURGICAL.

By HENRY GRAY, F.R.S., late lecturer on Anatomy at St. George's Hospital, London, New American Edition, enlarged and thoroughly revised, by J. CHALMERS DA COSTA, M.D., Professor of Surgery and Clinical Surgery, and EDWARD ANTHONY SPITZKA, M.D., Professor of Anatomy, Jefferson Medical College, Philadelphia. Imperial octavo, 1625 pages, with 1149 large and elaborate engravings. Price, with illustrations in colors, cloth, \$6.00 net; leather, \$7.00 net. Philadelphia and New York: Lea & Febiger, 1908.

Perhaps no other work is so fairly entitled to the distinction of being the leading treatise in medical literature as is Gray's Anatomy. The genius of its author not only as an investigator but as a teacher of his subject, so impressed itself upon all his work that the first edition of his book at once won for itself the premier place among publications of its class. Upon this foundation have been wrought out the several editions which have followed in rapid succession, and these in their turn have kept Gray's standard up to the original record of scientific accuracy and educational value established by the author.

The present edition has been undergoing revision for the past two years. Every department of the work has been brought into accord with the latest developments of the subject, so that as in the past Gray's Anatomy is still the standard. A wealth of illustration so presented as

to make every feature easily accessible to the student and enable him to fix these graphic records in memory is one of the most valuable and characteristic features of the book, while the text lucidly and systematically elaborates the details of the entire subject. It is gratifying to find the defects of former editions being so rapidly and so thoroughly eliminated, and to be able to commend in all respects this admirable treatise to everyone whose education must include a knowledge of human anatomy.

A TEXT-BOOK OF DENTAL PATHOLOGY AND THERAPEUTICS. For Students and Practitioners. By the late HENRY H. BURCHARD, M.D., D.D.S. Revised by OTTO E. INGLIS, D.D.S., Professor of Dental Pathology and Therapeutics, Philadelphia Dental College. New (Third) Edition, thoroughly revised. Octavo, 720 pages, with 567 engravings and 1 colored plate. Cloth, \$5.00 net; leather, \$6.00 net. Philadelphia and New York: Lea & Febiger, 1908.

"Burchard's Dental Pathology, like Gray's Anatomy, exhibits a rare phenomenon, the continued survival of an author by his work. It is interesting to trace the cause leading to the same result in books so widely apart in subjects. The two authors died young. Gray produced his immortal work at thirty-one, and, dying at thirty-four, saw only the original of the many editions which have appeared in its first half-century just rounded out. Burchard also died young.

but, like Gray, wove into his work the threads of genius, which are undimmed by time, and which, being the insight into truth, must survive. Burchard found dentistry stigmatized as a craft guided by empiricism, and left it a science founded on the same basis as any other in medicine. Empiricism is a difficult method of following any subject, for it implies an aggregation of isolated facts. Science immensely facilitates acquisition by providing the connecting reasons and mapping out the territory with its paths easily traversible. Herein lies the

great merit of Burchard's book, and that it is appreciated is shown in the demand for successive editions. Its subject is very progressive, and Dr. Inglis has again rendered his profession the service of a revision, bringing this sterling work abreast of the latest developments."

We quote from the *Dominion Dental Journal* the foregoing references to the new edition of Burchard's Pathology, because they so clearly set forth our own views as to this important work that it would be unnecessary to restate them in different terms.

REVIEW OF CURRENT DENTAL LITERATURE.

[*Oesterreich.-ungar. Vierteljahrsschrift für Zahnheilkunde*, July 1908.]

ON THE DEVELOPMENT OF PULP-NODULES (DENTICLES). BY DR. L. FLEISCHMANN, VIENNA.

From the clinical point of view, pulp-nodules (denticles) are any hard neoformation which either lies free, without being connected with the walls of the pulp-chamber, or which starting from the pulp-chamber wall like a tumor, protrudes into the pulp-chamber. In an anatomical sense these hard tumor-like neoformations are called pulp-nodules (denticles) only when they exhibit histologically the character of true dentin, that is, of a calcified basic substance permeated by small tubules. If this dentinal characteristic is missing, as sometimes happens with nodules lying free in the pulp, we speak of simple calcification of the pulp tissue. Dental nodules must be distinguished from those forms of neoformation of dentin which are known under the name of secondary dentin. In accordance with Reich (*DENTAL COSMOS*, August 1908, p. 882) the author makes the following subdivisions of irregular dentin:

(1) Irregular dentin, which by a physiolog-

ical process after the complete development of the tooth is formed in regular layers on the inside of the normal layer of dentin, and gradually produces a considerable narrowing of the pulp-chamber. Contrarily to Reich's findings, this irregular dentin is also observed in retained teeth.

(2) Irregular dentin which in consequence of external influences such as abrasion, caries, fracture in limited portions of the layer of dentin, produces a thickening of the dentinal layer on the inner side. This thickening generally forms a slightly hemispherical prominence.

(3) Irregular dentin consisting of tumor-like formations which according to their situation may be designated as (a) interstitial denticles, if they lie within the dentinal layer itself, (b) adherent, if they protrude into the pulp-chamber but are firmly connected with the dentinal layer, (c) free, if without any connection with the dentinal layer they lie free in the pulp-chamber. Free and interstitial denticles can be easily distinguished from irregular and secondary dentin by their situation. The adherent denticles, however, are not so sharply defined. Contrary to irregular dentin, they are strongly prominent

tumor-like formations; different also from secondary dentin, which may also resemble a protruding hemispherical tumor, they develop without an apparent external cause. We must keep clearly separated the products of simple calcification and true denticles, although both phenomena may be observed in one and the same pulp. Calcification consists simply in deposits of calcium salts between the fibrillæ of the pulp, which by confluence may sometimes reach considerable size. The question of the development of the denticles in the anatomical sense is still much disputed; the author briefly reviews the numerous theories advanced. In his microscopic researches he observed in a calf's tooth three free denticles in the lower third of the canal. Each one of these was surrounded by a simple layer of cells, which in their arrangement and structure resembled normal odontoblasts. In some places continuations of the cells protruded into the tubules of the denticles analogous to Tomes' fibers in normal dentin. This, according to our conceptions of the formation of the dentin, proves that the formation of the denticles is due to formative cells, *i.e.* odontoblasts. In regard to the origin of the denticle-odontoblasts, Dr. Fleischmann's microscopic preparation shows that the three denticles, although lying closely together, are separated from each other and from the normal odontoblasts by normal pulp tissue. There was no visible indication of any connection of the odontoblasts of the various denticles with each other or with the normal odontoblasts. Neither does the normal layer of odontoblasts show any trace of interruption or irregularity which would indicate the place where a connection might have been present. If, therefore, we consider at what an early stage of development the denticles in the preparation were formed, it is impossible that the denticle-odontoblasts owe their origin to an eversion of the layer of normal odontoblasts, as Weld has suggested. The fact that the denticles grow and do not have definite size from the beginning is clearly demonstrated by their concentric laminated structure. Since the denticles present a surface of closely arranged cells, we have to surmise that in the growing denticle a continual substitution of odontoblasts takes place, which are formed by a transformation of pulp-cells. Despite the close arrangement of the denticle-odontoblasts we find some portions with tubules and some without.

In the portions that are without tubules we observe that the odontoblasts have no dentinal continuations, *i.e.* Tomes' fibers. This leads to the supposition that every pulp-cell possesses the permanent faculty of changing into an odontoblast, *i.e.* of forming dentin, but that only those cells can send out continuations which have remained, as it were, in an embryonal stage.

As to the development of adherent denticles, the author observed cases in which a direct transition of the denticle tubules into the dentinal tubules was present and cases in which no connection between the two tubule systems was perceptible. From the continuation of the dentinal tubules into the denticle we can conclude that the same odontoblasts that have formed the normal dentin or its tubules have also formed the denticle. From the size and the situation of the denticle we can further conclude that the layer of odontoblasts, after first having formed the normal dentin, must have turned out toward the interior of the pulp in that part where the denticle was developed. In the other case, where the dentinal tubules embrace the denticle and where the odontoblasts and the dentinal tubules form a unit, we must surmise that the odontoblasts were separated, but that the formation of normal dentin went on. The denticle must therefore have originally been free and in consequence of the thickening of the dentinal wall must have grown together with the latter.

The development of interstitial denticles is evidently due to a free denticle being completely surrounded by the growing dentin.

As to the cause of the formation of denticles, nothing certain is known so far. We only know that denticles, although they occur most frequently in carious teeth and in those with large metal fillings, may be formed independently of external influences, for they are found in completely healthy teeth of young and old individuals. The amorphous homogeneous basic substance of the denticles in its appearance and in the coloring test resembles a calcium deposit such as is frequently found in pulps containing denticles. In analogy to heterotopic osseous formations there was first a deposit of calcium salts in the pulp tissue. The calcium deposit irritates the neighboring cells and causes their transformation into odontoblasts. The newly formed odontoblasts proceed to form dentin around the calcified nucleus.

[*Deutsche Monatsschrift für Zahnheilkunde*,
January-June 1908.]

DEFICIENCY OF MINERAL SALTS AND
DEGENERACY. BY DR. C. RÖSE, DRESDEN.

In his study, which has since its first publication appeared in book form, Dr. Röse has presented a most scientific and careful investigation into the importance of the alkaline salts, *i.e.* calcium and magnesia, in the development of the human body, especially the teeth. These salts undergo a continual metabolic process, by which the old used-up molecules are replaced by fresh ones. All the tissues of the tooth—dentin, cementum, and bone—are continually undergoing this metabolism, with the apparent exclusion of the enamel. The mineral salts are present in the organic tissues in the form of highly molecular organic combinations. Experiments with man and beast have shown that during starvation considerable quantities of calcium and magnesia are excreted in the urine and feces, which chiefly represent the waste products of the bones and the teeth. But not only the hard tissues require these salts, but also numerous other soft tissues; normal blood contains considerable amounts of calcium salts. If these are precipitated, the blood serum is no longer able to maintain the beating of the heart (frog's), while with calcareous serums the heart continues beating for hours. With a calcareous solution Hedon and Fleig were even able to start the peristalsis of the intestines in a frog seven days after the animal had been killed. Besides the calcium, the sodium carbonate exerts an irritation upon the intestines, for after its removal the peristaltic movements cease. After these introductory remarks the author reports his numerous investigations into the relationship between the deficiency of mineral salts in several German districts and the condition of the inhabitants' teeth. He found that the condition of the teeth in the first place depends upon the quantity of calcium salts in the drinking water, and second, in the farming products. He also observed that not so much the average hardness as the stable hardness of the drinking water remaining after boiling plays an important part. For even in limestone districts the hardness of the water after boiling is very small. Cultured man, however, takes most water in boiled condition. In

one and the same town the wells were found to give water of very different hardness. Cow's milk contains a very high calcic percentage, so that in districts poor in mineral salts milk will make up for any deficiency. The proportion of calcium and magnesia and their various chemical combinations also exert an influence on the human system. The most perfectly built teeth were found in provinces where the water besides calcium contains plentiful quantities of magnesia in the proportion of 4:1. In boiling water the earthy salts combined with carbon dioxide are eliminated as transient hardness; the soluble sulfuric and nitric combinations remain as stable hardness. The prejudice against nitric waters is not justified, for they are only detrimental if they contain an excess of nitric acid or nitrous acid. Since the nitric waters generally contain sufficient quantities of magnesia, they produce excellent yellow and whitish-yellow teeth, while the teeth are less perfectly developed by the use of purely gypsiferous water. A certain percentage of sulfate of calcium is necessary in the drinking water, since in combination with the nitric mineral salt combinations, it determines the stable hardness and prevents the extraction of the saline elements from vegetable foods in boiling. The condition of the teeth stands in direct ratio to the stable hardness of the drinking water. Numerous examinations made of school children and military recruits in Germany, Poland, and Sweden revealed two possibilities: Either in territories rich in mineral salts the teeth are more firmly constructed and therefore offer greater resistance to the acids in the mouth, or the secretions of the mouth in these territories is of a healthier constituency. As to Black's contention that there are no teeth of good or bad structure, but that the different composition of the saliva produces caries, Röse points out that in burning the enamel an evident difference of hard and soft enamel is noticeable, and that Black in his researches has omitted to study the enamel, which is of the greatest importance; for the dentin of differently well-built teeth according to Miller exhibits no difference in its power of resistance to acids of the mouth. Teeth of good or bad structure are easily recognized by their color; the hard enamel presents a mirror-like smooth appearance, and a fine light yellow or whitish-yellow.

low color, while poorly built teeth have a dull appearance and a gray or bluish-gray color. The former kind of teeth is found in districts rich in mineral salts, while in districts poor in salts the teeth are of gray color and exhibit under the magnifying glass numerous superficial unevennesses and grooves, which offer a field for caries and for green stain. In one and the same person caries progresses now quickly, now slowly, the reason for which must be looked for in the environment of the teeth, especially in the saliva. Deficiency in mineral salts and the condition of the saliva are therefore closely connected. Degeneracy of the salivary glands, which under normal conditions secrete alkaline saliva, of which 100 cubic millimeters should possess an alkalinity equivalent to at least 15 cubic millimeters of normal potassium hydroxid (1:10), is promoted by lack of mineral salts in the food and water. The percentage of calcium in the saliva is, according to Röse, subject to only small variations; the quantity and the alkalinity of the saliva is, however, greatly influenced by the water and food. Experiments in fully grown people showed that by food rich in mineral salts the alkalinity and the quantity of saliva can be increased, and that dental caries increases in inverse ratio to the alkalinity of the saliva. Very numerous and diligent examinations of military recruits lead to the observation that the teeth are mirrors, as it were, of the physical constitution, and that the harder the drinking water, the higher the percentage of men fit for military service, and that the entire physical development of youth is retarded by nutrition lacking in calcium salts. In regard to the relationship between the proportions of mineral salts in the soil, the drinking water, and the farming products, Dr. Röse came to the conclusion that the considerable differences in the quality of the teeth in different districts do not depend upon the differences in mineral salts in the farming products, but upon the different hardness of the drinking water. Soft water, moreover, possesses the noxious property of extracting the mineral salts from foods in boiling. This was tested in a series of experiments on different vegetables. The author also made feeding tests on a goat, whose milk well-nigh corresponded in its content of mineral salts to the amount of calcium contained in the ani-

mal's feed. The same holds true of eggs. With the increase of cultural refinement the lack of mineral salts in the nutrition increases. Especially in large cities the small consumption of milk, which is richest in calcium, and the water supply from reservoirs, are most detrimental to the health. Besides lacking calcium this water is also deficient in carbon dioxid. The problem of hardening water which is deficient in mineral salts is very difficult, and the author's experiments have only resulted in a useful boiling water. The so-called organic mineral salt preparations on the market are contraindicated, and natural food, such as milk, cheese, eggs, green vegetables, and leguminous food should take their place. An improvement in the structure of the teeth and the bones can only be expected if the entire metabolism of the blood and the rest of the body are favorably influenced by rational nutrition. The combinations of calcium and magnesia found in the bones and the teeth are as such insoluble in the blood and in all alkaline body serums. In the blood quite different combinations of mineral salts and albumin, which are easily soluble in alkaline fluids, are circulating, and these are changed into insoluble combinations in the cells, forming enamel, dentin, and bone. It is immaterial whether the mineral salts are introduced into the body in organic or inorganic form, as long as they are easily soluble and can be resorbed. The tribasic and dibasic mineral salts of phosphoric acid belong to the entirely insoluble or to the slightly soluble combinations. The more easily soluble monobasic salts, on the other hand, have an acid reaction, and occur in a normal human body only in the excrements, especially in the urine. A prescription of large quantities of acid mono-calcium phosphates would therefore only increase the tendency to morbid excretion of phosphates. Phosphoric acid is contained in all foods in abundance, and it is therefore preferable to prescribe combinations of carbon dioxid, sulfuric acid, and nitric acid. It is preferable, however, to prescribe natural mineral water rich in mineral salts. Most mineral waters have the disadvantage of containing too much iron. A table water, which is to remain clear in the bottle and potable to the last drop, should contain no more than 0.005 gram of iron. Besides the mineral salts some alkaline waters contain too much

sodium carbonate or sodium chlorid, which imparts to them a heavy taste. Bilin, Vichy, and similar waters are therefore contraindicated for continual use, as they produce indigestion, probably owing to an overstimulation of the stomach nerves. The half-artificial table waters, besides lacking in mineral salts, differ from the natural waters inasmuch as the carbon dioxid quickly escapes, while in the natural waters the carbon dioxid, which is much more intimately combined with the water, escapes in but very small bubbles. Natural mineral waters are therefore much more valuable for the digestion than the artificial ones. Dr. Röse concludes his diligent and admirably careful investigation with the admonition: "He who would secure for his children the advantages of nutrition rich in mineral salts must before their birth himself begin with the proper supply of mineral salts."

[*Revue Générale de l'Art Dentaire*, Paris, July 1908.]

HOW TO OVERCOME THE NON-TRANSLUCENCY OF ARTIFICIAL TEETH. BY H. LÉGER-DOREZ.

A tube tooth, if properly selected, is quite translucent and will appear like a natural one. A flat pin tooth, however, of whatever make, always appears like a "dead tooth," owing to its lack of translucency, which is due to the backing or to the elevation in the vulcanite to which the tooth is attached. Moreover, the oxidation which is produced by the infiltration of food particles, and which blackens the line of contact between the tooth and the backing, obliterates the translucency of pin teeth. Without sacrificing the solidity of the tooth to the esthetic appearance, the author suggests the following method for preserving the translucency of artificial teeth. As in ordinary backings the author employs a platinum-gold plate, somewhat thicker than usual. After making the two holes for the pins, the plate is trimmed and filed to the contour of the tooth. Above the two holes a third round or oval opening or "window" is burred with octahedral reamers of different sizes, so as to eliminate as much as possible the center of the backing, after which the backing is fastened to the tooth. Care must be taken not to overheat nor to employ too much solder. If the point of articulation

should coincide with the "window," a semilunar incision is made on both sides of the backing, so that it presents the shape of a T, through the broad footing of which the two holes for the pivots pass. The force of the antagonistic tooth will thus strike the stem of the T-shaped backing, and without impairing the solidity of the backing the two windows will afford free passage to the light. In some cases only one semilunar window may be cut into the backing on either of the distal surfaces of the tooth. This method prevents the accumulation of food particles between the backing and the tooth, with the fetor resulting therefrom, and guarantees a maximum translucency of the tooth.

[*Oesterreichische Zeitschrift für Stomatologie*, Vienna, August 1908.]

INDICATIONS FOR THE USE OF BALSAM OF PERU IN DENTISTRY. BY PROF. DR. B. MAYRHOFER, INNSBRUCK.

The black balsam of Peru as produced in Salvador is mainly composed of the oil of balsam of Peru (cinnamein, over 60 per cent.), and on account of its high price is frequently adulterated. According to F. A. Suter, balsam of Peru possesses a number of valuable therapeutic qualities: it prevents putrefaction and raises the reduced irritability and power of restoration in putrescent, gangrenous, and tubercular tumors, owing to its inhibiting and bactericidal properties. Although its bactericidal action is weak, nevertheless infected, ruptured, and crushed wounds quickly and smoothly heal under dressings of balsam of Peru. From various clinical reports and from his own experiments the author comes to the following conclusions: (1) Peru balsam, if brought into direct contact with a lesion kills staphylococci in 24 hours; (2) it exerts a bactericidal influence over its environment; (3) it possesses a considerable stability, and is only slightly resorbed by the tissues; (4) it strongly attracts leucocytes; (5) it has the faculty of enveloping bacteria; (6) it envelops dead or dying portions of tissue and by embedding the bacteria prevents their putrefaction; (7) it produces no untoward general phenomena, does not locally destroy the tissues, and does not, like most antiseptics, possess any caustic properties.

Above all, balsam of Peru is applicable in wounds after extraction, injuries of the gin-

givaë, fractures of the alveolar process, lacerations or incisions in the alveoli for removing deeply carious or fractured roots, and in all cases of oral surgery which otherwise necessitate numerous and tedious tamponade. In these cases the antiseptic action of the balsam and its faculty of enveloping dying or dead portions of tissue is of special value; for the disagreeable *fœtor ex ore* resulting from decomposition of the secretions of the mouth and from necrosis of some portions of the margins of the wound is removed, and serious infection, partial necrosis of the maxillæ, and pyemia are prevented. After the bleeding has been completely stopped and all coagulated particles have been removed from the mouth the alveolus is filled by means of an aseptic syringe with liquid balsam of Peru and covered with a small tampon of odorless gauze. Balsam of Peru is further indicated in large periosteal abscessed cavities, since the wounds thus treated, despite their unfavorable situation, remain aseptic. It is applied with good success in exterior dental fistulas, in which it limits the secretion, stimulates granulation, and prevents putrefaction, and is favorably indicated in necrosis and in fractures of the maxillæ. On its application as a material for root-canal filling in gangrenous teeth the author promises to publish an essay in the near future.

[*La Stomatologia*, Milan, October 1908.]

THE ANALGESIC PROPERTIES OF ALYPIN. BY DR. R. ROTELLI.

The local anesthetic alypin—essays on which have been reviewed in the DENTAL COSMOS for August 1908, pp. 884-885—has been examined by the author as to its chemical properties in comparison with cocain. Two years of experience, in which he has employed alypin in about three hundred cases, have led Dr. Rotelli to the following conclusions:

(1) Comparative stability of solutions of from 1 per cent. to 5 per cent. The weakest 1 per cent. solution tested is efficacious on the first day; the second day its action is very weak. In roots with complete alveolar absorption, where it is easy to obtain complete anesthesia, a 1 per cent. solution is sufficient for extraction. The 2 per cent. solution is not as strong on the second day as on the first, and it completely loses its anesthetic power

on the third day. The 3 to 5 per cent. solutions preserve their anesthetic property longer in proportion to their strength. Alypin consequently slowly decomposes and loses its anesthetic property, which renders necessary the frequent preparation of a fresh solution.

(2) Minimal dose. In cases of root-extractions where the alveolar margins have been destroyed by chronic abscess and absorption, $\frac{1}{2}$ of a centigram was found to be sufficient for perfect anesthesia, whereas 2 centigrams proved to be inefficacious in a case of extraction of the second and third lower molars in a patient with normally developed mandible. Experience shows that alypin is not effective if strong alveolar borders resist its action.

(3) Maximal dose. In twenty cases of extraction of several teeth, from 5 to 7 centigrams were injected without producing untoward symptoms. In only one case of extraction of eleven roots 8 centigrams of alypin were injected, the patient, though aged, comfortably bearing the dose. In summing up, the author gives to alypin the preference over cocain on account of its smaller toxicity.

[*Le Monde Dentaire*, Paris, August 1908.]

CLINICAL NOTE ON THE TREATMENT OF DENTAL EDEMA. BY DR. CH. L. QUINCEROT.

For cases of dental edema, in which the practitioner does not have at his disposal the excellent remedial agent of blue rays, the author recommends a very simple method which he applies after the proper dental operative treatment has been properly administered. A wad of cotton saturated in a solution of 1:4 parts of iodine and glycerin is placed on the painful portion of the gingivæ, left there for about ten minutes and renewed by the patient for about an hour. The cheek is then lubricated with 3 to 4 drops of olive oil, and a compress of crushed ice is applied to the painful region at short intervals in order to withdraw as much of the heat as possible, yet without producing congelation. If done carefully, the pain will be entirely relieved. If there is a tendency to suppuration, the pus will be discharged by way of the gingiva owing to the application of the ice, which in many cases will render surgical intervention superfluous.

PERISCOPE.

Paraffin Bath for Carborundum Stones.

—Carborundum stones will run truer and whirl up much less dust in dry grinding if they are soaked in melted paraffin for a few minutes. After the paraffin bath take the stones out and lay them on paper. The paper will absorb the surplus, and the stones will not be "sleazy" and disagreeable to the touch. With a stone treated in this manner one can grind a facing or artificial tooth without being compelled to inhale half of the porcelain removed. To be sure, a stone treated in this manner cannot be heated to red heat, but the paraffin bath puts it in excellent condition for effective disinfection with some liquid.—*Articulator.*

Sulfo-Carboic Acid for Pyorrhoeal Pockets.

—In very deep pyorrhoea pockets, where the gum is in nearly normal position but sensitive and highly inflamed, and the deposit is consequently very difficult of access, the case is simplified by packing the pocket with a rope of cotton or gauze saturated in a 25 per cent. aqueous solution of sulfo-carboic acid. By allowing the pack to remain for twenty-four hours, not only the deposit is softened but the necrotic area is benefited, and the margin of the pocket is opened so as to give free access and permit of scaling and polishing without lacerating the gum margin or producing much pain. This drug penetrates inflamed gum tissue and consequently its germicidal power is of great value in pus cases.—*ELGIN MAWHINNEY, Northwestern Dental Journal.*

The Seating of Base-Plates.—The reasons for the relief in an upper plate are:

(1) Running through the palate on the median line there is usually a hard, bony ridge. This ridge varies in size; it may be nearly invisible to the eye, but it is palpable by the finger, or it may represent a large bony formation of about three-quarters of an inch in diameter. This area of the mouth being hard and the gum tissue being soft, it is necessary to construct the plate so that it may rest harder on the gum tissue than on the central portion of the palate.

(2) The hard structure of the palate

changes but slightly in form during the period the plate is worn, while the alveolar ridge disappears. The relief allows the plate to follow this absorption of the ridge, avoiding heavy pressure on the palate and rendering the plate useful for a longer time.

(3) Allowance must be made for the inaccuracy of the plaster model caused by the expansion of the plaster of the impression and of the model in setting.

Another reason for relief of the palate where considerable absorption has taken place is to prevent the pressure of the base upon the anterior palatine nerves, as they come through the foramen just back of the anterior alveolar ridge. Pressure upon these nerves may cause severe pain. Quoting Dr. T. W. Brophy: "The pressure and irritation caused by the base-plate resting upon these nerves is a frequent cause of neuroma and may necessitate an operation."—*J. A. BULLARD, Dental Review.*

Adenoids.—This disease has apparently increased in frequency with prodigious rapidity in recent years, and its increase seems to have been concomitant with the habit of keeping windows open night and day in summer and winter. Moreover, observations seem to indicate that the proportion of children affected with adenoids is distinctly greater among the more educated classes who are most scrupulously insistent on keeping their windows open at night throughout the year. Children brought up with open windows appear, indeed, to be about fifteen times more likely to contract adenoids than those who sleep with the windows shut on cold or damp nights, or they seem at least more prone to adenoids than those who sleep with closed windows throughout the greater part of the year. The few figures obtained thus far are as follows: Among 69 children who slept with closed windows, two cases of adenoids were found, while among 49, who slept with open windows at night in winter and summer, 22 cases of adenoids were found. It will be seen from the above that adenoids appear to be confined almost entirely to those children who sleep with open windows; but, notwithstanding this, the other contributing factors must not be overlooked, such as clothing, per-

spiration, digestion, and the development of the palatal arch. It would probably be more satisfactory, therefore, if in further statistics the relative frequency of adenoids were considered class by class, since conditions, such as housing, heating, clothing, etc., may be essentially different.—J. SIM WALLACE, *Dental Record*.

Suggestions Regarding Lower Plates.—The causes of irritated spots, although they are readily seen on the gum, are not always easy to locate on the plate. Take a little moist whiting on a spatula and touch the spot with it, then replace the plate; on removing the plate the exact spot where relief is needed will be marked by the whiting. If after the posterior teeth have been removed and a partial plate has been worn for a long time, the anterior teeth are removed and a full plate is worn, the anterior gums settle, and the bite shortens at this point; the posterior teeth, however, do not shorten, and under pressure irritation at the heel results. The remedy consists in shortening the molars and not in filing the plate.—L. P. HASKELL, *Dental Review*.

The Use of Porcelain Mixed with Alcohol.—Probably any porcelain that is to be applied to an invested matrix should be mixed with alcohol, to form a cream-like consistence. The mixture is flowed into position with the point of the carver or with a small brush, and it is not to be carved like porcelain that has been mixed with water. After moistening the matrix with alcohol, fill it almost to the margin with the paste that is to form the foundation of the inlay. The alcohol is then evaporated and the porcelain is fired to a high biscuit. After this firing the investment should be chilled by dipping the base of the cup in water, using care to prevent the investment from becoming moist. If more foundation is required, a second application is made and biscuitied.—*Items of Interest*.

To Reduce Thermal Conductivity in Gold Inlays.—The thermal conductivity of pure gold is greater than that of any other filling material, and the majority of gold inlays are large fillings, bringing a mass of metal into close proximity to the pulp. Such cases show marked thermal irritation, and if this practice continues, embarrassing cases of pulpitis will occur which can only be treated by drilling through a mass of cast gold, which is always a difficult and painful operation.

The trouble may be avoided in several ways: First, by regularly building up an

intermediary insulating layer of cement, with the same care as has heretofore been used; secondly, by carving from the pulpal surface of the wax model, previous to its investment, such a portion of the wax as will insure a fair thickness of cement over the pulp, producing a slightly hollow inlay; thirdly, by plentifully applying reliable quickly drying cavity varnish over the pulpal walls before obtaining the wax model. With our new methods of gold inlays, thermal conductivity is to be more seriously considered than heretofore.—H. T. SMITH, *Items of Interest*.

Why Gold and Porcelain Should Take the Place of Amalgam.—Ten reasons are presented here, why gold in one form or another and porcelain should take the place of amalgam:

(1) Amalgam has been found wanting in edge strength, and edge strength is one of the most important factors in a good filling material.

(2) Amalgam has been abused and so misused that it is daily being condemned, which, however, in a number of cases, is nothing more or less than a fault of the operator in not preparing the cavity correctly. Amalgam is generally thought to be easy of manipulation.

(3) Gold meets nearly all the requirements of a perfect filling material with two possible exceptions—inharmony of color and incompatibility with tooth-structure—which bears out the theory that it should be more commonly used in posterior than in anterior teeth.

(4) There are now a number of different forms of gold, including the soft foils, the various forms of mat gold and the like, which are easy and rapid of manipulation, saving time to both operator and patient.

(5) Amalgam can be placed in an improperly prepared cavity, which is not the case with gold; for we all know that it is very difficult to place gold in an improperly prepared cavity.

(6) Patients are more likely to consult the practitioner concerning the anterior than the posterior teeth.

(7) When a posterior tooth is so far decayed as to make a gold filling impracticable, it may be restored by an inlay. If this is impossible the tooth should be crowned at once.

(8) Even though the theory were correct that porcelain inlays are not more commonly in use because of the disintegration of the cements with which they are set, we must bear in mind that both cements and porcelain are daily being improved.

(9) In case of decays in centrals, laterals,

and canines, where in the past gold fillings have been serviceable, and where porcelain is not available, it is best by far to immediately replace the filling by means of a porcelain crown, thereby making an almost permanent operation from the start.

(10) If dentistry is an art, as we are all compelled to recognize, our chief aim should be to adhere as strongly as possible to the theory as well as to the fact that we are trying to overcome unsightly conditions so frequently found in the anterior teeth.—OSCAR HAMMER, *Dental Era*.

Two Pulp in an Upper Central Incisor.—The following freak of nature is reported: A girl, of about sixteen years of age, applied to have a porcelain crown put on the root of an upper central incisor which several years before had been disfigured by trauma. The tooth showed signs of scrofulous diathesis, had a cavity, and a sickly whitish color with wrinkly edges, but presented absolutely normal form. The pulp was still vital, but an attack of caries had set in. After opening the pulp-chamber, an arsenic dressing was applied. Two pulps were removed from two root-canals, which were completely separated by an osseous partition. As the bur had injured this partition before the broach was introduced, it could not be decided whether anastomosis was present. One pulp was one-third of the size of the other.—*Deutsche Zahnärztliche Zeitung*.

Amalgam Fillings.—Cavity preparation for amalgam should differ from that of gold in that no marginal beveled edges should be left; amalgam will not retain an attenuated edge like gold, and this little error has often been the cause of failures, because the source of the trouble was not recognized. Another cause of failure in amalgam fillings is improper or incomplete insertion or condensation. The use of masses of amalgam, large in comparison with the size of the cavity, and the use of large pluggers in inserting and condensing the filling, cannot produce as satisfactory results as small masses and relatively small pluggers. The first pieces of amalgam placed in the cavity should be a little softer than those that follow, so that the softer pieces can be readily adapted to all pits, grooves, or angles. The subsequent pieces being drier can, by trituration and packing, be united to those that have gone into the cavity before, and a thoroughly homogeneous mass will be the result, with the obliteration of air-spaces between the filling and the cavity walls.—C. P. PRUYN, *Dental Review*.

A Hint in Taking a Bite.—The bite for a full denture in a patient who is wearing a full plate on the opposite jaw is taken conveniently and without unnecessary annoyance to the patient by building the wax rim on the wax base-plate as usual, trying the wax in the mouth and trimming it to the proper form. Instead of building more wax on the rim to obtain the impression of the teeth on the plate, the wax base-plate and the denture are removed from the mouth without disarranging them. This may be accomplished by sealing the wax to the teeth at two or more points with a hot spatula while the patient's jaws are closed in their correct relation. Take the case to the laboratory, place the model in firm position in the base-plate, and flow melted wax around the occlusal surfaces and the cutting edges of the teeth on the plate. This will produce the desired impression on the wax, and the correctness of the bite may be verified by removing the plate from the wax, placing the wax base-plate and the denture in the mouth and having the patient close the jaws. The various advantages of this method need no further explanation.—*Pacific Dental Gazette*.

The Value of Perfect Occlusion.—A perfect occlusion is in many cases of the utmost importance from an esthetic point of view, and is an index that all is well with development. The converse, that every malocclusion entails serious dental disability, or that every defective occlusion must be filled in to its normal complement, by no means holds. If in the course of regulating a child's teeth you have attained a stable arrangement of the teeth, harmonizing with the patient's featural conformation, the bite may practically be left to itself. If in course of treating an adult mouth by fillings and extractions you have left one good articulating side, or opposing first or second molars one in each quarter, and only some opposing premolars, the bite will be sufficient, and there will be no need for artificial supplements; in fact the patient is better without them, on account of the difficulty of keeping any and every form of artificial teeth thoroughly clean. When, in adult life, the bones are set, the tendency to compression of the dental arches and tilting of the teeth by muscular action of the lips and cheeks, or to elongation of healthy teeth, practically ceases, and one molar and one premolar are enough to prevent the cheeks from falling in.

It is not the perfect occlusion that is of value, but the perfect arch, and this is valuable chiefly for its beauty and as offering the best arrangement of the teeth for combat-

ing caries and pyorrhea, *i.e.* for cleaning; but with the setting of the bones it loses value even on this account. Both man and the

lower animals get along perfectly well with very distorted and very deficient occlusion. —J. G. TURNER, *British Dental Journal*.

OBITUARY.

DR. FRANK S. HARRIS.

DIED, November 17, 1908, in the fifty-seventh year of his age, at his home in Henderson, Dr. FRANK S. HARRIS.

At the time of his death Dr. Harris had nearly completed his thirtieth year of practice in Henderson, where he was born. He was prominent in all matters pertaining to the general welfare of the community in which he lived, and was highly esteemed by all who came in contact with him. Prominent in church and civil affairs, he impressed his individuality upon the section in which he lived, and his influence for good was also felt in a broader field, inasmuch as he held a high office in the dental society of the state and was at all times prominent in the business of the association, having been its president and a member of its executive council, and at the time of his death he was a member of the state examining board.

Dr. Harris was a man of great refinement of nature, modest and quiet in his demeanor at all times, but a man of force and progressiveness.

He was born May 19, 1852, his father being Dr. Adam Clarke Harris, who was a physician and also a preacher in the Methodist Protestant Church of North Carolina, and who traced back his relationship to Isaac Watts, the hymn-writer. His mother was Martha Ann Hunter, a member of a prominent family in eastern North Carolina, and a lineal descendant of Oliver Cromwell. His first wife was Miss Agnes O. Wills of Halifax county, N. C. She lived only about four years after their marriage, and in 1894 he married Miss Carrie Corinne Coghill. She, with four children, survives him, he having lost one little daughter in 1906.

The dental fraternity of the Old North

State loses one of its staunchest members in his death, and he will be mourned by all who knew him in a professional and social capacity.

"IN MEMORIAM" RESOLUTIONS.

Dr. A. B. Longshore.

At a special meeting of the Shamokin Dental Protective Society, held November 27, 1908, the following resolutions relative to the loss sustained in the death of Dr. Longshore on the preceding day, from a complication of diseases, were adopted:

Whereas, This society has heard with feelings of sincere sorrow of the death of one of its most cherished members, Dr. Longshore, it is hereby

RESOLVED, That in the death of Dr. Longshore this society has lost one of its most valued members, a man who so fearlessly performed every duty to his profession and to this society that he had won his way to a very honorable standing among those with whom he associated; and be it

RESOLVED, That in the death of Dr. Longshore the profession of dental surgery has lost one of its most valued members, who in a modest but forceful way contributed much to the uplift of his profession by his methods of practice; and be it further

RESOLVED, That this society extend to his bereaved family its sincere sympathy, and that a copy of these resolutions be forwarded to his widow, also that copies be sent to the dental journals.

RESOLVED, That this society attend the funeral in a body.

R. HOLLENBACK,
EDW. E. FAUST,
EDW. R. KER.

SOCIETY NOTES AND ANNOUNCEMENTS.

N. D. A. COMMITTEE ON HISTORY.

GUERINI'S HISTORY OF DENTISTRY.

NOTICE is hereby given to the subscribers to this important work that the manuscript and material for illustrations are now in the hands of the printer. The requisite number of advance subscribers have been obtained and the work is being pushed through the press as rapidly as is consistent with the production of a volume of this importance. The committee is assured that in the matter of paper, press-work, typography, and general technical features of the manufacture of the book, no pains nor expense will be spared to produce a result in every way satisfactory.

CHAS. McMANUS, *Chairman.*

AMERICAN DENTAL CLUB OF PARIS.

BANQUET TO DR. JOHN W. CRANE.

THE American Dental Club of Paris gave on November 21, 1908, a banquet to Dr. John W. Crane, in commemoration of his fiftieth anniversary of practice in Paris.

Dr. Crane is the last survivor of that group of eminent men, comprising such names as Brewster, Evans, Gage, Coffin, and Abbot, who, toward the middle of the last century, established the reputation of American dentistry abroad. The banquet was attended by colleagues from over a great part of Europe, who rejoiced in an opportunity to do honor to one so universally respected and admired. There were also a great number of congratulatory letters and telegrams, including many from America.

The W. D. Miller Club of Berlin made Dr. Crane an honorary member. The American Dental Club of London presented him with a beautiful gold cigar-case, bearing the engraved signatures of the givers. The American Dental Society of Europe presented him with

an exquisite silver-gilt loving-cup, and the American Dental Club of Paris with a gold repeater watch and a seal copied from an ancient artistic model, to be a constant reminder of the affectionate regard of his Parisian colleagues. Dr. Brigiotti, who had been a pupil of Dr. Crane, offered a ship in full sail composed of fifty varieties of flowers. Dr. Roussel of Paris presented a superb album to contain the portraits of those present.

It chanced, through the unavoidable absence of many who had been expected, that just seventy-two men were at table, the exact number of Dr. Crane's years, and each carried away as a souvenir the elaborate menu, ornamented with a portrait of Dr. Crane, as well as an indelible impression of a most delightful festival.

DELTA SIGMA DELTA FRATERNITY

AT SEATTLE EXPOSITION.

THE Seattle Auxiliary wishes to announce the annual Supreme Chapter meeting of Delta Sigma Delta Fraternity in Seattle, on July 21, 22, and 23, 1909. July 24th will be "Delta Sigma Delta day" at the Alaska-Yukon-Pacific Exposition.

C. F. Fiset, *Historian.*

EUROPEAN ORTHODONTIA SOCIETY.

At the third annual meeting of the European Orthodontia Society, held in Berlin, October 2 and 3, 1908, the following officers were elected for the ensuing year: Axel Lundström, Stockholm, president; Lee A. Watling, Berlin, vice-president; William G. Law, Berlin, secretary-treasurer. The next meeting of the society will be held in Wiesbaden, Germany, at Eastertime.

WILLIAM G. LAW, *Sec'y,*
In den Zelten 18a, Berlin.

NATIONAL DENTAL ASSOCIATION.

THE thirteenth annual meeting of the National Dental Association will be held in Birmingham, Ala., on March 30 and 31, and April 1 and 2, 1909. The following section officers have been appointed:

SECTION I.

Prosthetic Dentistry, Crown and Bridge Work, Orthodontia, Metallurgy, Chemistry, and Allied Subjects.

HARRY E. KELSEY, *Chairman*, Commonwealth Bank Bldg., Baltimore, Md.

H. H. JOHNSON, *Vice-chairman*, 306 Second st., Macon, Ga.

J. S. SPURGEON, *Secretary*, Hillsboro, N. C.

SECTION II.

Operative Dentistry, Nomenclature, Literature, Dental Education, and Allied Subjects.

W. G. EBERSOLE, *Chairman*, 800 Schofield Bldg., Cleveland, Ohio.

R. H. WALKER, *Vice-chairman*, 231 Main st., Norfolk, Va.

L. L. BARBER, *Secretary*, 311 Summit ave., Toledo, Ohio.

SECTION III.

Oral Surgery, Anatomy, Physiology, Histology, Pathology, Etiology, Hygiene, Prophylaxis, Materia Medica, and Allied Subjects.

C. C. ALLEN, *Chairman*, Rialto Bldg., Kansas City, Mo.

J. E. CHACE, *Vice-chairman*, Ocala, Fla.

J. W. HULL, *Secretary*, Altman Bldg., Kansas City, Mo.

V. E. TURNER, *President*,
Raleigh, N. C.

CHAS. S. BUTLER, *Sec'y*,
Buffalo, N. Y.

Change in Membership Regulations.

At the 1908 meeting, the National Dental Association adopted an amendment making all members in good standing in their state dental societies, or their allied societies, eligible to membership in this association, by presenting to the proper authorities at the regular meeting a certificate signed by the president and secretary of any such society.

Those desiring to take advantage of their privileges under said amendment should act promptly, as the National Association meets early next year, the last Tuesday of March 1909, at Birmingham, Ala.

Blanks can be secured from the secretaries of the various state dental societies or the undersigned.

H. C. BROWN, *Corresponding Sec'y*,
185 E. State st., Columbus, O.

AMERICAN NATIONAL COMMITTEE ON FIFTH INTERNATIONAL DENTAL CONGRESS.

TO BE HELD AT BERLIN, AUGUST 1909.

At a meeting of the Executive Council of the National Dental Association held at Pittsburg, Pa., Saturday, October 10, 1908, the following were appointed as the American National Committee, to forward the work of the Fifth International Congress and provide for the representation of American dentistry at that congress—to be held in Berlin, Ger., Aug. 1909:

American National Committee.

Edward C. Kirk, Philadelphia, Pa., *ch'man*.

Burton Lee Thorpe, St. Louis, Mo., *sec'y*.

Truman W. Brophy, Chicago, Ill.

A. W. Harlan, New York, N. Y.

B. Holly Smith, Baltimore, Md.

G. E. Savage, Worcester, Mass.

Wm. Carr, New York, N. Y.

W. W. Walker, New York, N. Y.

J. D. Patterson, Kansas City, Mo.

Gordon White, Nashville, Tenn.

Chas. R. Turner, Philadelphia, Pa.

Chas. McManus, Hartford, Conn.

G. V. I. Brown, Milwaukee, Wis.

N. S. Hoff, Ann Arbor, Mich.

F. E. Ball, Fargo, N. Dak.

L. P. Dotterer, Charleston, S. C.

Eugene H. Smith, Boston, Mass.

Chas. L. Alexander, Charlotte, N. C.

COMMITTEE ON ESSAYS.

Edward C. Kirk, *chairman*.

Burton Lee Thorpe, *secretary*.

L. P. Dotterer.

COMMITTEE ON CLINICS.

Wm. Carr, *chairman*.

J. D. Patterson, *secretary*.

Chas. L. Alexander.

NATIONAL ASSOCIATION OF DENTAL FACULTIES.

THE National Association of Dental Faculties will hold their annual meeting in connection with the National Association of Dental Examiners in the Hotel Chamberlain, Old Point Comfort, Va., August 2, 3, and 4, 1909, commencing at 10 A.M.

Rates will be the same as the National Association of Dental Examiners. Railroad and steamship rates will be given at a later date.

B. HOLLY SMITH, *Chairman*.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

THE twenty-seventh annual meeting of the National Association of Dental Examiners will be held at the Hotel Chamberlain, Old Point Comfort, Va., the first session opening at 10 o'clock A.M., Monday, August 2, 1909, and continuing during the 3d and 4th.

The result of the mail vote by the committee to ascertain the consensus of opinion as to place and date, from October 19th to the present date, was ninety-one votes for Old Point Comfort the first three days of August, thirteen for Birmingham in March, seven for Birmingham in July; the president has therefore selected Old Point Comfort.

The rates will be: American plan \$3.00 per day without bath and \$4.00 per day with bath. Large and commodious meeting-rooms will be furnished free. Railroad and steamship rates will be furnished at a later date.

CHAS. A. MEEKER, *Sec'y*.

COLORADO COLLEGE OF DENTAL SURGERY.

THE annual midwinter clinic of the Alumni Association of the Colorado College of Dental Surgery and the Denver Dental Association will be held at the college building, February 11, 12, and 13, 1909. All ethical dentists are invited to attend and take part. For particulars address

A. W. STARBUCK,
14th and Arapahoe sts., Denver, Colo.

SOUTHEASTERN KANSAS DENTAL ASSOCIATION.

THE fifth annual meeting of the Southeastern Kansas Dental Association will be held at Girard, January 18 and 19, 1909. The program has been arranged for two full days of clinics and papers. Several of the manufacturers have promised to exhibit.

THOMAS M. ROBERTSON, *Sec'y*.

UNIVERSITY OF BUFFALO DENTAL ALUMNI ASSOCIATION.

THE tenth annual meeting and clinic of the Alumni Association of the Dental Department of the University of Buffalo will be held on Friday and Saturday, February 19 and 20, 1909, in the dental building. An excellent program is being prepared. All graduates and ethical practitioners are invited to attend and participate in the meeting.

HARRY F. TANNER, *President*,
ABRAM HOFFMAN, *Ch'man Exec. Com.*,
GEO. B. MITCHELL, *Sec'y*,
483 Main st., Buffalo, N. Y.

XI PSI PHI FRATERNITY.

THE New York Alumni Association of the Xi Psi Phi Fraternity met at the St. Denis Hotel on November 18, 1908, and elected their officers for the ensuing year. It was decided to hold a banquet on January 30, 1909.

The membership has passed the 200 mark, and it is earnestly desired that every alumnus be present. To any who have not received full particulars the same will be gladly furnished by.

J. N. GELSON, *Sec'y*,
673 Vanderbilt ave., Brooklyn, N. Y.

CALUMET DENTAL SOCIETY.

THE annual meeting of the Calumet Dental Society was held at Gary, Ind., December 7, 1908. The following officers were elected: B. S. Gardner, Gary, Ind., president; G. W. Winslow, Chicago, Ill., vice-president; J. H. Long, Gary, Ind., secretary-treasurer.

J. H. LONG, *Sec'y*.

COMPLIMENTARY BANQUET TO DR. C. R. BUTLER.

THE dental profession of Cleveland, Ohio, will give a complimentary dinner to one of its most honored members, Dr. C. R. Butler, on March 11, 1909, at seven o'clock P.M., in commemoration of the completion of fifty-one years of dental practice by the doctor. This will be a democratic affair, to which all ethical dentists are invited. The price per plate will be within the reach of all. Those desiring a place at the banquet will kindly notify the secretary at least ten days before.

S. B. DEWEY, *Sec'y*,
Lennox Bldg., Cleveland, Ohio.

ACADEMY OF STOMATOLOGY.

FIFTEENTH ANNIVERSARY.

ON February 19, 1909, the fifteenth anniversary of the founding of the Academy of Stomatology will be held at the College of Physicians, Philadelphia. It is to be a meeting of unusual interest, where dentists and medical men of national repute will take part.

The subject for the evening will be trifacial neuralgia. Dr. J. Bethune Stein of New York will report on some vivisection experiments and show some lantern slides, where the inferior dental canal of a dog has been extirpated, care being taken to leave the tips of the adjacent roots untouched. He will then by slides demonstrate whether or not the pulps have been affected in a pathological way as to their nervous and blood supply.

Dr. Truman W. Brophy of Chicago, who in the course of his surgical operations has employed this same experiment on human beings and has found under these conditions that the pulps of the teeth next to the extirpated canal are not necessarily destroyed, will give a fifteen-minute paper on the peripheral causes of trifacial neuralgia and the necessary surgical procedure in the treatment.

Dr. John B. Deaver will give a ten-minute paper on intracranial trifacial neuralgia and the surgical treatment thereof.

Dr. John K. Mitchell will give a ten-minute paper on the symptomatology and treatment from the general practitioner's point of view.

The discussions of these papers will be opened by many prominent men—Dr. James

E. Power of Providence, Dr. I. Norman Broomell, Dr. J. Chalmers Da Costa, and Dr. Morris J. Lewis.

A cordial invitation to attend is extended to all practitioners who are interested in the subject.

WEST VIRGINIA STATE DENTAL SOCIETY.

THE West Virginia State Dental Society held their annual meeting at Fairmont, W. Va., October 14, 15, and 16, 1908.

Dr. H. H. Harrison, the president, was ill at home, so the first vice-president, Dr. Chas. H. Bartlett, occupied the chair. Dr. Harrison's address was read by the secretary, and Dr. Bartlett in taking the chair delivered an able, instructive paper. The first morning's session was taken up with roll-call, payment of dues, discussion of needed legislation, and appointment of committees. At the afternoon session Dr. Geo. H. Wilson of Cleveland, Ohio, gave a paper (illustrated by lantern) on "The Anatomical Articulation of Teeth;" also a talk, illustrated by charts, on "Clasps, Their Proper and Improper Use and Arrangement," followed by a general discussion of the subject. In the evening Dr. H. L. Ambler of Cleveland, Ohio, gave a very interesting talk on "Travels in the Orient," also illustrated by lantern slides.

CLINICS.

Thursday was entirely devoted to clinics by the following:

Dr. E. R. Kibler, Indianapolis, Ind.: "Porcelain Inlay," chair clinic.

Dr. J. A. Libbey, Pittsburg, Pa.: "Immediate Root-canal Filling," chair clinic.

Dr. A. C. Plant, Wheeling, W. Va.: "Ascher's Artificial Enamel Filling," chair clinic.

Dr. H. H. Myers, Pittsburg, Pa.: "Preparation of Cavities for Gold and Porcelain Inlay (with models)," table clinic.

Dr. J. A. Libbey, Pittsburg, Pa.: "Annealing Swiss Broaches," table clinic.

Dr. F. L. Wright, Wheeling, W. Va.: "Cast Gold Inlay," chair clinic.

Dr. Geo. H. Wilson, Cleveland, Ohio: "Cast Aluminum Plate," table clinic; also, "Models for Anatomical Articulation of Teeth, Models for Clasps," table clinic.

Dr. A. Earl Hennen, Wheeling, W. Va.: "Cast Gold Inlay," chair clinic.

At 7 o'clock the Fairmont dentists gave a banquet to the society, which was attended by all the members, all the exhibitors, a few invited physicians, and others.

Dr. John W. Storer of Wheeling, W. Va., had been appointed toastmaster and after the feast of good things called on the principal speaker of the evening, Mr. Lee S. Smith of Pittsburg, Pa.

Mr. Smith gave a highly entertaining talk on his travels around the world. Others were called on by the toastmaster and responded in both serious and humorous talks.

Friday morning was taken up with unfinished clinics, discussions and election of officers, as follows:

Dr. Jas. E. Dowden, Fairmont, W. Va., president; Dr. John H. McClure, Wheeling, W. Va., first vice-president; Dr. L. J. Walker, Grafton, W. Va., second vice-president; Dr. F. L. Wright, Wheeling, W. Va., secretary; Dr. D. C. Clark, Blacksville, W. Va., treasurer.

Wheeling was chosen as the next place of meeting. The time is October 13, 14, and 15, 1909.

F. L. WRIGHT, *Sec'y*.

OHIO STATE DENTAL SOCIETY.

At the forty-third annual meeting of the Ohio State Dental Society, held in Columbus, December 1, 2, and 3, 1908, the following officers were elected: W. H. Whitslar, Cleveland, president; M. H. Fletcher, Cincinnati, first vice-president; A. O. Ross, Columbus, second vice-president; F. R. Chapman, Columbus, secretary; W. A. Price, Cleveland, treasurer. Directors for three years—L. P. Bethel, Columbus; C. I. Keely, Hamilton; J. R. Callihan, Cincinnati, and Henry Barnes, Cleveland.

F. R. CHAPMAN, *Sec'y*,
305 Schultz Bldg., Columbus, O.

ARMY DENTAL CORPS.

DENTAL Surgeon F. Homer Wolven from duty in the Department of the Visayas, to Zamboanga, Mindanao, for duty. (Sept. 24, Phil. D.)

Leave for fifteen days, to take effect October 11th, is granted Dental Surg. Hugh G. Voorhies, Fort Snelling. (Oct. 3, D.D.)

The leave granted Dental Surgeon George I. Gunckel is extended fifteen days. (Oct. 31, W.D.)

Changes of stations for month ending December 12, 1908:

Edwin P. Tignor, ordered to Forts Howard and McHenry, Md., successively, for temporary duty.

George E. Stallman, left Fort Logan H. Roots, Ark., for duty at Fort Sill, Oklahoma.

Jean C. Whinnery, left Fort Casey, Washington, for duty at Fort Ward, Washington.

EXAMINATION OF DENTISTS FOR THE ARMY.

THE Surgeon-general of the Army announces that while there are no vacancies in the dental corps, he intends to hold examinations to establish an eligible list from which appointments will be made as vacancies occur.

Applicants for appointment as dental surgeons in the United States army will be authorized to present themselves at the nearest military post at which a commissioned officer of the medical corps is stationed, for examination as to physical qualification for employment, and those found physically qualified will be invited to report at West Point, N. Y., or San Francisco, Cal., about December 1908, for the professional examination. No allowance can be made for expenses incurred in undergoing these examinations.

Application blanks can be procured upon application to the Surgeon-general of the army. The essential requirements to securing an invitation are that the applicant shall be between twenty-four and thirty years of age, a graduate of a standard medical and dental college, and shall be of good moral character and habits.

Army dentists are employed under a three years' contract at the rate of \$150 per month; are entitled to traveling allowances and suitable quarters; they have the privilege of purchase of supplies at the army commissary. The hours of official duty are from 9 A.M. to 4 P.M., although they are subject to emergency calls. During other hours they are permitted to treat persons not entitled to gratuitous services with their own materials.

DISTRICT OF COLUMBIA BOARD OF EXAMINERS.

THE next semi-annual examination of the Board of Dental Examiners of the District of Columbia will be held at the Georgetown University, January 4, 5, and 6, 1909. All applications for examination must be accompanied by a fee of ten dollars, and filed with the secretary. For further information address

STARR PARSONS, *Sec'y*,
1309 L st., N. W., Washington, D. C.

SOUTH DAKOTA BOARD OF EXAMINERS.

THE next meeting of the South Dakota State Board of Dental Examiners will be held at Sioux Falls, S. D., January 12, 1909, beginning at 1.30 sharp, and continue three days. All candidates must bring appliances and materials necessary to do all kinds of

filling, crown and bridge work, and to articulate a full upper and lower set of teeth. A recent ruling of the board makes it compulsory with all candidates to have their examination fee of \$10.00 in the hands of the secretary before January 5th, and positively no candidates will be received who have not complied with said rule.

G. W. COLLINS, *Sec'y*.

INDIANA BOARD OF EXAMINERS.

THE next regular meeting of the Indiana State Board of Dental Examiners will be held in the State-house at Indianapolis, beginning Monday, January 11, 1909, and continuing four days. All applicants for registration in the state will be examined at this meeting. For further information, blanks, etc., apply to

F. R. HENSHAW, *Sec'y*,
Middletown, Ind.

UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING NOVEMBER 1908.

November 3.

- No. 902,660, to H. A. S. HOWARTH. Emery-wheel dresser.
No. 902,723, to P. GAUER. Hydraulic lifting gear.
No. 902,726, to MOSES GREER. Ring clamp.
No. 902,796, to F. W. and T. H. BATES. Combination tooth-brush and powder holder.
No. 902,942, to ST. GEORGE CRAIG. Dental tool moistener.

November 10.

- No. 903,343, to J. A. VAN VLECK. Artificial tooth.
No. 903,344, to EDW. C. WACKLER. Dental lip protector.

- No. 903,361, to F. M. DAVIS. Reclining chair.

November 17.

- No. 903,904, to A. C. SMITH. Wrench.
No. 904,126, to CHAS. H. HART. Plugger.

November 24.

- No. 904,529, to J. F. HAMMOND and R. B. SAVIN. Electric furnace muffle.
No. 904,601, to FRANK D. CASE. Artificial tooth.
No. 904,831, to WERNER VON BOLTON. Tantalum metal.
No. 904,990, to CHAS. R. POWERS. Dental broach.
No. 905,083, to J. ELWOOD LEE. Method of putting up antiseptic bandages.

THE DENTAL COSMOS.

VOL. LI.

FEBRUARY 1909.

No. 2.

ORIGINAL COMMUNICATIONS.

ORTHODONTIA AND FACIAL ORTHOPEDIA.

By FRANK L. PHILLIPS, D.D.S., New York, N. Y.

ORTHODONTIA and facial orthopedia have been practiced to some extent for many years, and yet the remarkable results obtained in this most important branch of corrective surgery are known to very few members of the medical, and even of the dental profession.

Although often the chief desire of the patient and the object of the dentist are the local results procured by restoring the contour of the face and getting the teeth into proper position to perform their office of mastication, these are but the primary benefits derived from this work, which, in my opinion, is one of the broadest and most important fields of corrective surgery.

In orthodontia, not only are the teeth moved to their proper positions and the appearance of the face vastly improved, but the upper air-tracts are opened to their natural capacity, congestion is relieved, muscular tension is lessened, mental activity is stimulated, and the general health improved to a surprising degree.

Anatomically, we may divide the cases

which present themselves into two general classes, viz: (1) Those in which the upper incisors close in front of the lower, and (2) those in which the upper incisors close behind the lower.

Without considering the subject from an esthetic standpoint, though the disfigurement present may be the chief reason why a dentist is consulted, the most important pathological condition to be overcome by orthodontia is mandatory mouth-breathing, with its train of ill effects on the system.

This condition of mandatory mouth-breathing is to be expected only in cases coming under class I—for, as will be shown farther on, the deformity present in class II militates against mouth-breathing. Nasal obstruction is obviously always present in mandatory mouth-breathing, and according to whether it is primary, resulting in maxillary deformities, or secondary, produced by these, we may divide cases coming under class I into two varieties:

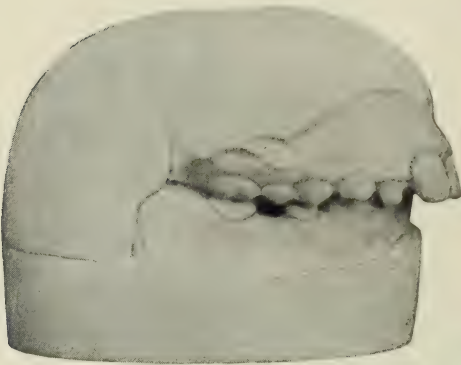
(A) Primary maxillary deformity, with its accompanying habit of mouth-breath-

ing, which by its irritating effect on the fauces leads to hypertrophies resulting in nasal obstruction, and consequent mandatory mouth-breathing.

(B) Maxillary deformities, secondary to nasal obstruction with mandatory mouth-breathing, which may be followed by habitual mouth-breathing even if the obstruction be removed.

To illustrate the first variety, primary maxillary deformity, Fig. 1 is presented. This is taken from a cast of the teeth and jaws of a typical mandatory mouth-breather, a boy of thirteen years of age.

FIG. 1.



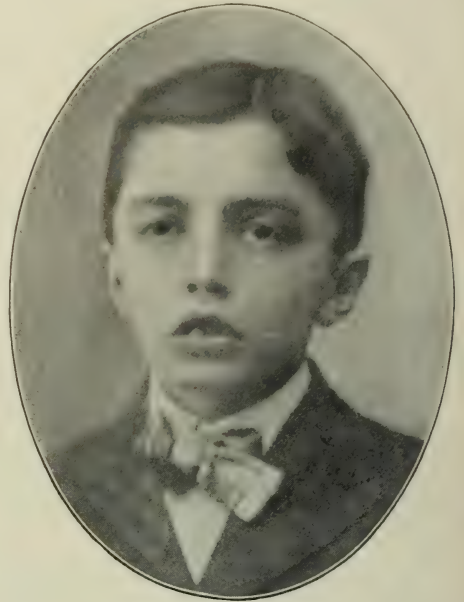
(Class I, variety A.) Casts of mouth of Wm. F.

By studying the figure, the deformity can readily be seen to reside chiefly in the maxilla, and to consist of a marked protrusion of that part of the alveolar process carrying the upper incisors. Instead of being rounded as it normally is, it extends outward and is pointed like a V, thus leaving a considerable space between the upper incisors and the lower ones, which are inserted in a mandible comparatively normal in contour. This space prevents the lips from being brought together, except by considerable effort, and predisposes to habitual mouth-breathing.

The boy patient from whom this model has been secured had breathed through his mouth ever since the eruption of the upper permanent teeth, owing

to the above-described protrusion of the incisors. On examination of the throat and nasal passages, which is always the first step to be taken, hypertrophied tonsils and adenoids were found to be present. The nasal passages were very much contracted in all their diameters, and the arch of the mouth was badly formed, for in mouth-breathers, the tongue, instead of resting firmly against the hard palate and the upper alveolar ridge, and giving by its slight but constant pressure a

FIG. 2.



(Class I, variety A.) Portrait of Wm. F., age thirteen.

natural support to the arch, thus assisting in its development, lies loose on the floor of the mouth. The natural development of the arch and the nasal passages is thereby not only retarded, but the constant lateral pressure of the facial muscles causes contraction, which will continue until ossification is complete.

When I first saw this boy, he could bring his lips together only with difficulty; the upper lip, instead of lying firmly and evenly over the teeth, was

curled up from lack of use; he was exceedingly nervous, having choreic twitchings of the face under the least excitement, and even while talking.

Under treatment the deformities of the teeth and the jaw completely disappeared, the upper lip assumed its natural position, the face began to show breadth and fulness instead of the previous drawn, emaciated appearance; the dull, degenerate look peculiar to those cases gave way to a bright and firm expression, and there were no more twitch-

almost idiotic expression. The lower jaw is narrow, affording insufficient space for the teeth, which are consequently irregular, and often thrown out of line to an extreme degree.

This maldevelopment of the mandible is traceable to the nasal obstruction which is always present. The continual downward and backward pull of the muscles attached to the lower jaw from below, which is exercised to keep the mouth open in mandatory mouth-breathing, prevents the normal development of

FIG. 3.



(Class II.) Before and after treatment. (Age twenty-eight years and eight months when treatment was begun.)

ings; in short, there seemed to be a complete transformation, both mental and physical.

During the process of correction the boy continued his studies as usual, never missing a day at school, nor was his work in any way retarded by his wearing the appliance used in treating such cases.

The conditions in this case were to a great extent hereditary, as an examination of the boy's father showed similar deformities of the teeth and jaws.

In the second variety, which is represented by Fig. 3, the fault lies in the mandible, while the upper jaw may be normal or nearly so. It is characterized by the narrow, retreating chin, its recession imparting to the face a gaping,

the bone. As a result the two jaws do not mate, the teeth are out of line, and proper occlusion is impossible.

It can be readily seen that even if the obstruction in the nose is overcome, nasal breathing can seldom be established without such dental regulation as will enable the patient to bring the teeth together and close the lips without effort. Highly satisfactory results can be obtained by the use of an apparatus which, by mild and continuous pressure, reduces the contraction and brings the jaw out to its normal position.

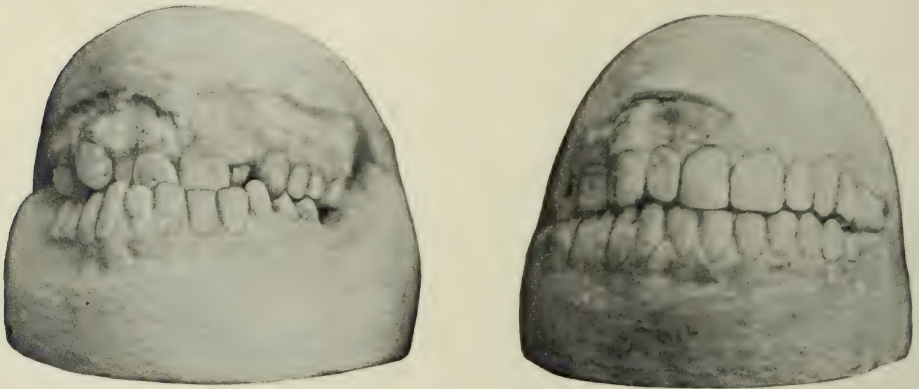
In either variety of cases it is impossible for normal development to overcome the deformity. The irregularity and uneven occlusion prevents any possibility of spontaneous restoration.

In this connection, the advantages of nasal breathing—the establishment of which is the chief end in view—over mouth-breathing may be briefly stated. In breathing through the unobstructed nasal passages, the air is inhaled slowly and in sufficient quantities. By inspiring through the nose the chest can be expanded from one-half to one and one-half inches more than by inspiring through the mouth, consequently the breathing capacity is increased, and the lungs are properly aerated. As the air passes

Troublesome pharyngitis, laryngitis, with inflamed condition of the bronchi, inviting pulmonary tuberculosis, are included in the train of symptoms which arise in the mouth-breather.

The second class of maxillary deformities, namely, the long protruding mandible, where the upper incisors close in a relation posterior to the lower ones, is illustrated by Fig. 3. If this deformity be slight or moderate it gives a strong, determined expression to the face, but if it be excessive this effect is lost.

FIG. 4.



(Class II, variety A.) Another form of mouth-breather. Before and after treatment. (Miss C., age sixteen.) Shows on the left the upper teeth locked behind the lower.

along the highly vascular upper air-tracts it absorbs warmth and moisture, irritating particles are arrested, and any noxious gases, by acting on the highly sensitive tissues, warn the subject of danger.

In the mouth-breather, on the other hand, there are no such safeguards. The air is drawn into the mouth, throat, and bronchi in a cold, dry, irritating condition, without being warmed, moistened, or purified. This predisposes the patient to a catarrhal, inflamed condition of the delicate structures which the air encounters; the mouth is dry, the sense of taste diminished and the saliva decreased in amount. Hypertrophied tonsils, adenoids, and Eustachian catarrh, leading to deafness or other ear troubles, ensue.

Mouth-breathing is seldom found in such cases, and then only when there is a decided nasal obstruction. The upper lip is usually thick, and lies heavily upon the lower one and upon the lower teeth, effectively excluding the air from the closed mouth. But though mouth-breathing is not to be expected, the interference with mastication renders the condition also a pathological one. In this case, as in most others of this class, there are but four teeth—namely, the third molars, that occlude perfectly; eight others barely touch, and the incisors cannot be brought together.

With such a condition it is evident that mastication is very imperfectly performed. Saliva and air are insufficiently incorporated with the food, which is

passed into the stomach in an improperly divided, lumpy condition. Indigestion follows, and with it a whole train of symptoms which should be well known to every practicing physician and dentist.

I would say in conclusion that it is not the purpose of this paper to go into the *modus operandi* of correcting these deformities, but simply to show some of the benefits derived from orthodontia and facial orthopedia.

TREATMENT OF INTERSTITIAL GINGIVITIS.

By EUGENE S. TALBOT, M.S., D.D.S., M.D., LL.D., Chicago, Ill.

FIFTEEN years' continuous study of inflammation of the gums and pericementum and absorption of the alveolar process have resulted in a line of rational treatment based on scientific methods. Researches have shown that, in both animals and man, evolution—due to environment and disease under the law of economy of growth, or use and disuse of structures—is the foundation. If the law of evolution could be reversed and our progeny educated to return to primitive methods of using the jaws in mastication, this disease, as well as deformities of the jaws, irregularities of the teeth, and tooth-decay, would be far less prevalent. To accomplish this would require special training and selection. Generations of persistent effort would be necessary to carry out this reform before the ideal race could be produced. In the meantime we must meet these conditions as we find them, and how best to accomplish this demands the attention of investigators.

It has been demonstrated many times that interstitial gingivitis is due to both constitutional and local causes. In the treatment of constitutional interstitial gingivitis, it must be borne in mind that the patient always has a tendency to other grave disorders, the symptoms of

which can be easily determined and which, if allowed to remain, will eventually produce disastrous results.

The accumulation of waste products not properly eliminated and circulating in the blood-stream interferes materially with metabolism, and self-poisoning or auto-intoxication is the inevitable result.

These various poisonous substances have in some cases been accumulating in the blood and tissues for years, and it becomes very necessary not only to demonstrate their presence, but in some way to estimate the amount of poisonous material in the blood, so that we may have some guide as to the persistence required in administering the proper method of treatment. At present, the only method of locating these poisons is the examination of the urine, and the definite indications are excessive urinary acidity and indicanuria.

When a patient presents himself suffering from interstitial gingivitis, first inquire carefully into his history; viz, his family—married or single; habits—sedentary or otherwise; diet—use of stimulating foods and drinks; hereditary factors—if any; general health—as to pain in joints, muscles, headache, rheumatism, asthma, constipation, kidney, liver or venereal disorders, tuberculosis,

stomach disorders, etc. An intelligent digestion of the data elicited will give a definite idea as to the line of treatment. Have the patient save the urine voided during twenty-four hours—this must be measured to ascertain the quantity passed in twenty-four hours. Examine this for the degree of acidity and indican only, if the patient is under thirty years of age. The average dentist can easily do this. If the patient is above thirty it is advisable to have a thorough urinary examination made by some medical laboratory to ascertain in addition if albumin, sugar, pus, blood, or casts are present. If such conditions are present, the patient should be informed and recommended to a physician. If the urinary acidity is high—above forty degrees—and indican is present, they should be gradually reduced to the normal (30° - 40°) by the use of suitable alkaline remedies and intestinal antiseptics.

During the past twelve years I have done considerable experimenting along these lines, and through the kindness of the Abbott Alkaloidal Company I have been able to have my preparations compounded. The following formula, after some minor changes, has finally been adopted, having given constant satisfaction. This combination has proved to be of such value that I am now giving it to the profession. Each teaspoonful (60 grains) contains:

Sodium bicarb.,	40 grains.
Sodium sulfate,	10 “
Sodium sulfocarb.,	5 “
Colchicin,	1/250 grain.
Juglandin,	1/3 “
Xanthoxylin,	1/3 “
Aromatics, q. s.	

One-half to one teaspoonful should be given in a glass of hot or warm water one-half to one hour before meals. This preparation will rapidly diminish a high urinary acidity, and reduce a urine abundant in indican to the normal. If the urinary acidity is below thirty degrees, and less than forty-eight ounces of urine are passed in twenty-four hours, the patient should increase the amount of

water taken in twenty-four hours. The normal amount of liquids in twenty-four hours should equal ten to twenty glasses of pure water. A second urinalysis for acidity and indican after two or three weeks will indicate the result of the treatment.

The orthodox local treatment of removing all irritation must be thorough. Pyorrhea alveolaris (pus infection) cannot be present without there first being an interstitial gingivitis. Remove the interstitial gingivitis, and the pyorrhea alveolaris will take care of itself. To reduce the inflammation and to restore the gums and the alveolar process to a normal condition requires more than the mere application of drugs to the surface of the gums. The inflammation, being deep-seated, requires the application of some drug that will penetrate into the alveolar process as well as the gum tissue, and reach the arterial system in the bone. No preparation will accomplish this as well as iodine. To further improve the power of absorption, glycerin is an excellent medium, and to further increase its usefulness, zinc iodide has been added. The following prescription applied locally upon the gums twice per week will be of great benefit:

Iodo-glycerole. (Talbot.)

Zinc iodide,	15 grains.
Water,	10 “
Iodine,	25 “
Glycerin,	50 “

This will make about two fluid ounces. The use of a tooth-powder or paste to which has been added a small amount of C. P. zinc sulfocarbolate rubbed into the gums with the gum-massage brush is of value. Severe cases seem to progress more rapidly when the mouth is rinsed four or five times a day with fifteen per cent. zinc sulfocarbolate.

Since disuse of the structures is a factor in this disease, constant friction is necessary, and a gum-massage brush—not a tooth-brush—should be used to stimulate the gums.

In 1886 I commenced a systematic

study of brushes for gum-massage purposes. After eight years of experimentation, while studying the etiology of the disease, I succeeded in producing a gum-massage brush (Fig. 1) which has given splendid satisfaction. The bristles of the brush should be unbleached and should be made of two grades, medium and hard. Two brushes should be used, one

Zinc sulfocarb..	5 per cent.
Alcohol.	30 “
Water,	65 “
Oil wintergreen, q. s.	

I have obtained good results in those cases of long standing where the disease has been allowed to progress until the teeth have slightly loosened, especially

FIG. 1.



every other day, to allow the bristles to become thoroughly dry. A soft brush is of no value and should never be used, since the desired results cannot be obtained. A gum wash, to be used with the gum massage for the purpose of stimulating and contracting the gums and also for destroying the bacteria in the mouth, is composed of the following:

if the patients are young, by placing them on whole wheat or rye bread, requiring them to masticate thoroughly, thus in a measure restoring the law of use where disuse of structures formerly prevailed. While the treatment is proceeding the patient's diet and habits must be properly regulated so as to prevent the further formation of an excess of acids and indican in the system.

SYPHILIS IN ITS RELATIONS TO DENTITION.

By Dr. JOSEPH CAVALLARO, Florence, Italy.

(Concluded from page 34.)

(IV.)

CASES FROM PERSONAL OBSERVATION.

CASE I. F. L., male, ten years of age, from Florence. The father died a few years ago from cerebral syphilis. The mother is still living and is also syphilitic, through conjugal contagion. She has been pregnant three times; she had two abortions, one at the fifth and the other at the seventh month. After the second miscarriage she was affected with osteocopic pains and papular manifestations, whereupon she decided to undergo the specific treatment. The third pregnancy came to termination and she gave birth to a living child, the subject of this observation.

Nourished at the mother's breast for about a year and a half, he has always been more or less sickly and backward. When two years of age he had a purulent flow from the right ear, and after a few months also from the left ear. This flow, which persisted until a short time ago in the right ear, with marked decrease of audition, seemed cured at times but afterward recurred worse than ever. At four years of age the patient had trouble with his eyes. He learned to walk very late, and then uncertainly and with difficulty; in fact he has never walked alone and needs someone to guide him. The teeth erupted after the second year. The memory is poorly developed and mentality very limited; he has been at school three years and has hardly learned to count. At present he presents well-marked signs of infantilism. The skeleton is badly developed, the muscular development poor, and there is an almost total absence of fat; the skin is wrinkled especially at the ocular and labial angles, the complexion is of a yellow clay color. The head is large; the forehead presents two frontal protuberances. The nose is short and flat at the base.

Ocular lesions. The eyes present whitish opaque spots of interstitial keratitis, and upon ophthalmoscopic examination rudi-

mentary stigmata of peripapillary choro-retinitis (Antonelli). The vision is very much diminished.

The ears are small and bent forward. Owing to otitis media purulens, the audition is slightly diminished on the left and very markedly so on the right. The mouth is large and half open; the lips hang down. The testicles are almost atrophied. On the right leg a gumma in retrocession is present.

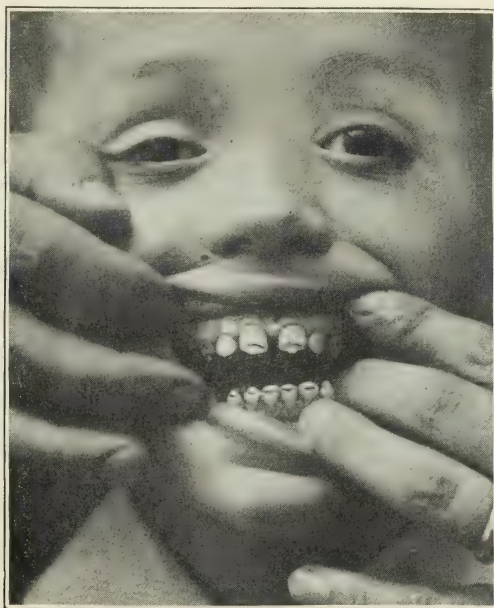
The dental stigmata are very important, typical, and characteristic. The teeth are loosely and badly set, badly formed, eroded, carious, and present several anomalies in number, form, and arrangement. They are sixteen in number, eight in each jaw (four incisors, two canines, and two first molars). There is congenital absence of the upper and lower bicuspid. Between the canines and the first molar a large gap, *i.e.* diastema, exists, which never contained any teeth. According to the mother's statement, in the first dentition the molars were missing, which, as we know, are replaced by the bicuspid in the permanent dentition. The two upper central incisors, which stand a little apart and converge, show between the two upper thirds and the lower third the typical semilunar erosion of Hutchinson. The fine atrophic appendix, which is a little darker than the normal portion of the tooth, is not yet worn away. The two upper laterals possess almost the shape of canines. On the canines at about the lower third a circular groove is observed from which a small atrophic tubercle emerges, which is not larger than a pinhead and looks like a stone enchased in the tooth. A deep circular constriction is also noted on the molars about the lower third of the crown, separating the sound portion of the tooth from four small atrophied buds of enamel which resemble small fungosities. In the middle of these tubercles, which are gradu-

ally worn out and which in the lower molars are already reduced to two, a central caries of the third degree exists. The lower incisors present a deep circular groove about the lower third, with the exception of the left lateral, which was late in erupting and is intact, presenting almost the form of a bicuspid. The erosion occupies the same level on the central incisors and a different one on the lateral. The canines and molars have

The boy is bow-legged. There is nothing remarkable about the eyes. The nose is very flat at the base. Nauseating fetor and a muco-purulent flow are emanating from it. Besides very marked labial ulcers the patient presents an ogival palate. On the oral mucosa several mucous patches are noticeable.

Dental stigmata. The patient possesses eight teeth—four upper incisors and four lower ones; they are rather small and

FIG. 11.



Hutchinson teeth. Cuspal atrophy of canines and molars. Sulciform erosions of lower incisors. Diastema.

the same cuspal atrophy as the upper corresponding teeth. The dark color of the teeth at the eroded points is noteworthy.

CASE II. A. P., male, three years of age, of unknown father. The mother is syphilitic. The boy was born before the termination of pregnancy, in the seventh month; he was first nursed at the mother's breast, afterward partially fed with the bottle. A year and a half ago, according to the mother's statement, he had red spots all over the body which disappeared after a few months, and there is a persistent purulent flow from the ears. He is just beginning to walk. The osseous and muscular development is very poor. The head is enormously large, of the type of congenital hydrocephalus. There is hyperostosis of the parietal protuberances.

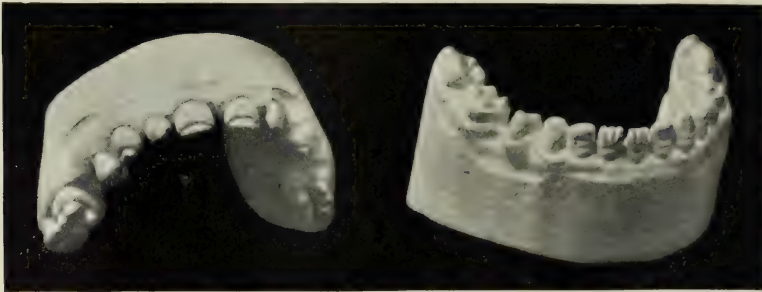
dwarfed, excepting the upper centrals, are widely and badly set and slightly crooked antero-posteriorly. The upper central incisors are much more developed than the others, and might be called giant teeth; they slant a little forward and converge. They present on their free edges a crescent-shaped notch (Hutchinson's tooth), which separates the upper portion of the sound tooth, which is of a bluish-white color due to a thin band of atrophic tissue, which is jagged, grooved, and of a yellowish-brown color. The dividing groove is still darker in color. The two upper laterals possess the shape of canines. The lower incisors present a sulciform erosion on their free edges.

CASE III. D. T., female, sixteen years of age, of unknown parents. We have not been

able to learn anything either of the hereditary antecedents or of the remote anamnesis. The patient presents marked infantilism, is very poorly developed, backward, and appears like a ten-year-old child. She possesses the characteristic face of an hereditary syphilitic, sunken and wrinkled, with the suffering, sad expression of an old woman. The head is flattened, the nose saddle-shaped; the patient speaks with difficulty and with bad articulation. Her intelligence is limited. Her eyes are affected with interstitial keratitis. In the right ear the audition is almost *nil*; it is also very limited in the left ear. The patient says that three years ago she began to observe a fulness of the ears and dulness

type, with the crescentic notch on the free edge; the atrophic appendix has not yet fallen away. The lateral incisors are of the deciduous set, slanting forward and inward and converging; they present the shape of canines and are not eroded. On the canines a circular groove is observed between the upper two thirds and the lower third, from which a small tooth, of atrophic tissue of a brown color emerges. The first bicuspid are normal; the second bicuspid are absent. The first molars present a considerably altered occlusal surface, separated from the other part of the normal and well-shaped tooth by a circular groove; they are shortened, atrophic, and irregular, with four small rough emi-

FIG. 12.



Hutchinson teeth. Cuspal atrophy of canines and first molars. Sulciform erosions of lower incisors. Vertical grooves. Diastema. Cup-shaped erosion of the persistent lower left deciduous molar.

in audition, which gradually and quickly increased, so that after a few weeks she could hardly hear. The lips are thick and hang down. Several linear whitish scars are seen at the labial angles. The gums are ulcerous, sanious, grayish; there is a fetid odor from the mouth.

The *dental stigmata* (see Fig. 12) are very interesting, and allow us to study, besides the lesions of the permanent teeth, several important lesions of the deciduous teeth, which have persisted in the second dentition. The teeth which are widely separated, small and dwarfed, present many anomalies in number, shape, and direction; there is a persistence of the deciduous teeth, partial congenital absence of the permanent teeth, diastema between the bicuspid and molars in the right and left maxilla and in the right mandible, also between the upper left lateral and the first bicuspid.

In the upper arch the patient presents eleven teeth, two of which are deciduous. The central incisors are of the Hutchinson

nences, almost conic, resembling small capitals of a yellow-brown color. On the right the second molar is already erupted; it is rather small and irregular, but not eroded.

The lower arch presents thirteen teeth, of which seven are deciduous. The central incisors present two horizontal grooves on the crown and two vertical grooves, as in idiots, which, starting from the free edge of the tooth, extend almost to the middle of the crown, where they meet the horizontal groove. The two laterals have two small horizontal grooves, which inclose a zone of normal tissue.

Of the canines, the right one is covered with an artificial crown; the left canine also presents two horizontal grooves. The patient avers that her deciduous incisors and canines have never fallen out, and these have the appearance of deciduous teeth. The reader's attention is called to this fact, because in this case we find the vertical erosions on the deciduous teeth which are common in the dentition of idiots but very rare

in the second dentition of hereditary syphilitic subjects. The first bicuspid is normal.

Even in this case the second bicuspid is absent. While, in the right maxilla, the space for the molars is empty, the left side is occupied by the second deciduous molar, which shows a characteristic cup-shaped erosion. The whole crown is covered by asperities and depressions, and presents the appearance of the so-called honeycomb tooth. This erosion of the deciduous teeth is very important, and of great diagnostic value, as by this means we may diagnose hereditary syphilis before the appearance of any other stigmata. The first molars present the same cuspal atrophies as the corresponding upper teeth.

CASE IV. S. N., male, three years of age. The father contracted syphilis in his youth and was never cured. Later, before marrying, he had typical tertiary manifestations, which were cured very superficially. The mother remained immune, and had four pregnancies with the following results: First pregnancy, abortion in the seventh month; second pregnancy, hydrocephalic child, which died almost immediately; third pregnancy, a child which died shortly after birth, of visceral affections; fourth pregnancy, the patient under examination. He was nursed at the mother's breast and developed fairly well for the first few months after birth, without showing any anomalies. The first teeth erupted at about the tenth month. He is of average development and has apparently a sound constitution. There is nothing remarkable about his eyes or ears. The palatal vault is almost entirely destroyed by a gummatous lesion, one point of which is still in evolution at the bottom of the pharynx.

Dental stigmata. The patient's dentition presents most characteristic anomalies. He has ten teeth in the maxilla and eight in the mandible, which are small, eroded, carious, and blackish in color. The two upper central incisors appear rather short and small. The free edge is separated by a deep horizontal groove from the base of the tooth, which seems flattened antero-posteriorly and is irregular, unequal, rough, and of a grayish-brown color. The tooth presents the shape of the so-called laminated tooth. The same lesion, but less marked, is found on the other incisors and on the canines. The molars present several irregular, short, tortuous grooves, more or less deep, with hollows and projections, giving the tooth the characteristic appearance of a honeycomb tooth.

CASE V. O. L., male, twenty-five years of age, of a syphilitic father. In the family history the deaths of several brothers and sisters at an early age are recorded. As to the patient's personal history, it is to be noted that after syphilitic manifestations he has several times undergone the mercurial cure. His present state is as follows: Normal osseous and muscular development, no cranial or facial asymmetry. The right tibia has a curvature with an anterior convexity and is flattened transversely from one side to the other, presenting the shape of a saber-blade.

The eyes present slight corneal albinism, the remains of interstitial keratitis. The ophthalmoscopic examination reveals nothing striking. The ears are sound.

Dental stigmata (see Figs. 13 and 14). The teeth are completely developed and fairly well set; all are present; they are covered with grooves in every part, running in every direction so that they resemble hieroglyphics. In some of the teeth these grooves are beginning to disappear, while in others they are very marked and accentuated by the difference in color. This is a typical and interesting case of generalized erosion, which also involves the bicuspid, and is one which is very rarely found. Generally four grooves can be counted on each tooth, alternating with corresponding zones of tissue normal in color and development, but they appear to be far more numerous. Many of them lie quite closely to the cervical border on one side and to the free edge on the other. It would have been very interesting to examine the roots, with the object of determining whether even these are grooved; but such an examination is for obvious reasons impossible. It must be noted that in this case the sulciform erosion is found together with the cup-shaped erosion, which in some of the teeth is very evident, in others less marked. The asperities of the honeycomb teeth lying near the occlusal edge may have been gradually worn away. The lower incisors present the sulciform erosion only. The central incisor presents on its free edge a curved incision due to a traumatic injury from a fall. The canines possess almost the shape of the so-called clove-shaped tooth, presenting an incisal edge divided into three denticular buds. The upper right first molar is covered with an artificial crown. The first upper and lower bicuspid present, like the others, a crown with four circular grooves, and a rugged occlusal surface. Two of the second bicuspid, the upper left and the lower right, are normal; the other two also show sulci-

form and cup-shaped erosions. The second and third molars are free from injury. Erosion on the bicuspsids is very rare and had not been found heretofore. Its presence, however, is not astonishing in cases of generalized

nursing was normal, but the development was very tardy; the child had great difficulty in learning to walk and to speak. He has very little intelligence. The first teeth only erupted at two years and a half and were

FIG. 13.



Labial aspect. Multiple sulciform erosions, general and involving the bicuspsids.

erosion such as the present one, in which syphilis in its various periods of activity followed by periods of rest has been able to affect all the teeth which calcify during intra-uterine and during the first months of extra-uterine life.

eroded and carious, according to the mother's statements. At four years of age he had a purulent flow from both ears, which lasted until a short time ago, causing a marked decrease of audition, also ozena, which is not yet cured.

FIG. 14.



Lingual aspects.

CASE VI. A. L., male, fourteen years of age. His father contracted syphilis two years before marrying; the mother was infected a few months after and had three abortions of from three to seven months; two pregnancies came to termination, but the fetuses were born dead; two children were born alive, but died young. The patient is the only child living.

He lived in the country for a while. The

The patient's present state is as follows: Poor osseous and muscular development; absence of adipose tissue; marked slowness in walking; mental backwardness. He exhibits cranial and facial asymmetry. The skull is very fully developed, especially about the occiput, which projects. The nose is saddle-shaped, the eyes are convergent, and the lips are thick, half open and hanging down. Besides the purulent otitis media and the ozena

already mentioned, he evidences former affections of the fundus of the eye. He also has an active gumma at the level of the lower third of the left tibia.

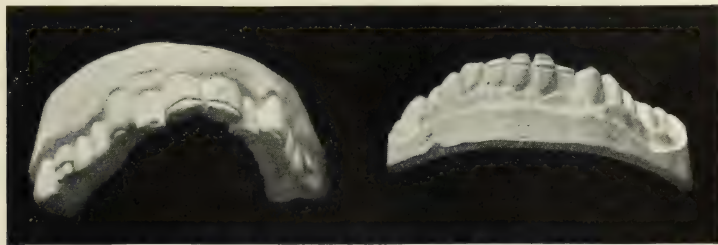
The *dental stigmata* are very interesting, and consist in anomalies in number, direction, and shape, in congenital absence of some teeth, and in a diastema between the canines and molars. Ten permanent teeth are present in the maxilla; the second bicuspid and second molars are missing. The teeth are of normal size, but irregularly set on the line of the upper arch, being forced forward a little and separated from each other; the two centrals are convergent. The mandible presents only eight teeth; all the bicuspid and the second molars are absent. The upper centrals exhibit Hutchinson's lesion. The canines at about the lower third show a kind

ported. The remote anamnesis of the patient cannot be obtained; we only know that for a time he suffered from the eyes. The osseous and muscular development is poor. The patient wears a dull suffering expression. The head is very large, the forehead very high. The venous circulation of the scalp is markedly developed. The patient limps, exhibiting talipes valgus. The testicles are rather atrophied and hardened.

The eyes present dotted corneal opacities, and the ophthalmoscopic examination reveals the rudimentary syphilitic stigmata of Antonelli. The ears show no anomaly. No active syphilitic lesion is present. The lips stand somewhat apart owing to a slight anterior prognathism with malocclusion of the dental arches. The palate is ogival.

The *dental stigmata* in this case (Fig. 15)

FIG. 15.



Hutchinson teeth. Cuspal atrophy of canines and molars. Sulciform erosions of lower incisors. Peg-shaped lower lateral incisor.

of circular constriction, to which an appendix-like, small atrophic tissue of the shape and size of a pinhead is attached (cuspal atrophy, Fournier's tooth). The molars present the same cuspal atrophy with four small appendicular elevations in the shape of buds, with the central black decay of Fournier's tooth. On the four lower incisors are double sulciform erosions, and on the upper canines and molars the same cuspal alterations are noted. In the molars, however, the denticular appendices are already beginning to wear away, and the decay is more advanced. Between the canines and molars a gap (diastema) is seen. It must be noted that this diastema has always existed, because the patient did not possess any deciduous molars.

CASE VII. G. F., male, eighteen years of age, of a syphilitic father and mother, who both died years ago. In the antecedent hereditary history three abortions and four deaths at an early age of brothers and sisters are re-

ported. The teeth are badly shaped, irregularly set, eroded, but strong, and erupted at the proper time. They number twenty-seven in all, fourteen in the maxilla and thirteen in the mandible. The right first molar had been removed, being affected with cuspal atrophy and erosion.

In the upper jaw the central incisors slant forward and converge; on their free edges Hutchinson's erosion is noticed. The atrophic appendix is almost entirely worn away, and in a short time they will be typical Hutchinson's teeth. The lateral incisors are almost peg-shaped and at the end of the free edge the remains of a sulciform erosion is noticed. The canines, which are strong and large, present cuspal atrophy; the projection found beyond the circular groove is gradually wearing out. The bicuspid are normal. The first molars present marked cuspal atrophy. They are divided into two almost equal parts by a deep circular groove; the part lying nearest to the neck is normal, the rest is atrophic, of a yellowish-brown color,

and divided into four small denticles, which are very evident on the right but are already destroyed on the left side, where the tooth begins to acquire the appearance of a flat tray-like tooth.

In the mandible the centrals present two horizontal grooves, of which the one near the edge is less marked. Between these two grooves, which are of a brown color, a zone of perfectly sound tissue of a yellowish-white color is found. The occlusal edge up to the first groove is reduced to a thin layer of atrophic tissue which is almost transparent; it is friable and doomed to destruction. The lateral incisors present only a sulciform erosion. It must be noted that this groove is on the same level as the upper groove of the central incisors (symmetry of lesions). The canines have already lost the small appendix, and they present, especially the right one, at the tip a flat and slightly rough surface of a darker color than the rest of the tooth. The bicuspid are normal. Of the first molars, the right one is missing, as already stated, and the left one, which had been worn away and reduced by one-half, has been covered by a gold crown. This case furnishes another illustration of multiple systematic dystrophies.

CASE VIII. C. L., male, sixteen years of age, of syphilitic parents. He is the only survivor of five brothers, the others having died very young from unknown causes. He has always been backward, sickly, and incapable of learning anything. He began to walk at six years of age; his teeth erupted very late. He presents marked infantilism of all the organs and tissues, without apparent malformation excepting a saddle-shaped nose, from which emanates a fetid odor caused by a muco-purulent flow. He presents a complete Hutchinson triad.

Auricular lesions: Almost complete deafness on the left, diminished audition on the right. Until a few years ago he had a purulent flow from both ears.

Ocular lesions: In both eyes, especially in the left, remains of parenchymatous keratitis are noted, and the ophthalmoscopic examination shows vascular alterations, disseminated foci of choroiditis, which are atrophic and slightly pigmented at their borders, constituting one of the forms of rudimentary ophthalmoscopic stigmata which Antonelli believes to be indisputable stigmata of hereditary syphilis.

Dental stigmata. The teeth, ten in each jaw, are rather irregularly set, are almost all carious, and stand widely apart. The

second molars are missing and the second bicuspid are just beginning to erupt. No deciduous teeth have persisted. The upper central incisors present Hutchinson's erosion and they converge. The laterals are dwarfed. The upper and lower canines have small sulciform erosions of yellowish-brown color. The first molars are reduced to black stumps which are worn almost to the gingival edge.

CASE IX. N. N., male, sixteen years of age, of syphilitic parents. The patient was rather backward as a child, and learned to speak and to walk only late. The eruption of the first teeth began after the twentieth month. His early infancy was passed fairly normally. At about nine years of age he had eye trouble, in consequence of which he underwent the specific cure.

Present state: The osseous and muscular development is rather good. He presents cranial asymmetry, with a marked occipital and slight left frontal protuberance, also slight facial asymmetry. The nose is rather large and flat at the base. We notice sternal malformation, the manubrium being pushed forward and forming a slight prominence. There is a large hyperostosis of the right tibia, which since about the third year has been very sore, and there are multiple gummata on the right leg of long standing, which are gradually disappearing owing to an adequate curative treatment. The patient presents genital infantilism, with rudimentary penis; the right testicle is atrophied, the left shows marked hardening.

The ears seem to be normal.

The ocular lesions consist in certain ophthalmoscopic stigmata of hereditary syphilis, namely, slate-like color of the central (peripapillary) region of the choro-retina (Antonelli).

The *dental stigmata* consist (see Fig. 16) in partial congenital absence of permanent teeth, in anomalies of shape, position, and number, and in a persistence of deciduous teeth. There are ten teeth in the upper and lower jaws respectively.

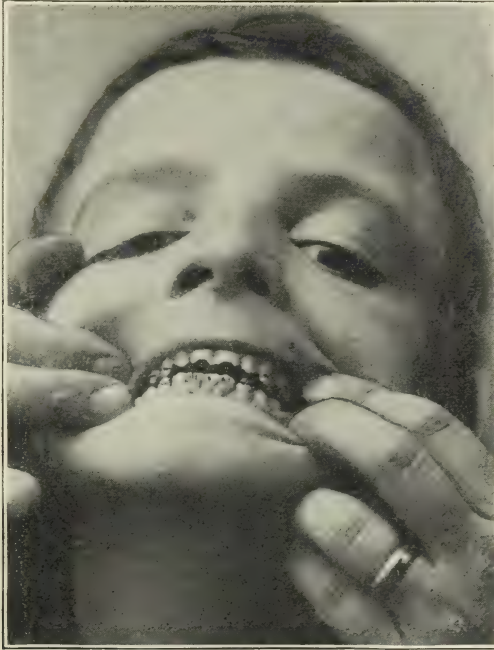
In the upper arch the central incisors have the typical shape of Hutchinson's teeth; they are convergent and show the characteristic crescentic notch on the free edges, bounded by two lateral tubercles, which almost mark the point to which the tooth would have grown had it normally developed. The tubercles are of a whitish-green color, while the borders of the Hutchinsonian notch are brownish. The crown, especially on its anterior surface, presents darker spots owing to the absence of enamel, so that the tooth appears stained

with dark and light spots. The same coloration is found on almost all the other teeth. The characteristic feature of this case is that the Hutchinson tooth has very early lost the atrophic appendix which exists beyond the groove. The laterals present an anomaly of shape, resembling the canines. On the canines cuspal atrophy is noted. The constriction found about the lower third is less deep than usual and the terminal atrophic appendix is as large as a grain of millet. The

for the typical cup-shaped erosion on the crown, and also a pointed prominence at the bucco-mesial angle of the occlusal surface. The first permanent molars are very small, carious, and affected with cuspal atrophy.

CASE X. G. L., male, fifteen years of age. The father, syphilitic, died a few years ago from progressive paralysis. The mother, who is still living and healthy, had two abortions and two children who died very young.

FIG. 16.



Hutchinson teeth. Cuspal erosions of canines and molars.

bicuspid is missing, and their place is occupied by the first permanent molars, which on the occlusal surface have a rough irregular protuberance of atrophic tissue, separated from the rest of the tooth by a circular groove.

In the lower arch the central incisors present a fan-shaped appearance; they are very narrow at the neck and become gradually larger toward the free edge, which by two vertical grooves is divided into three denticles. The lateral incisors have the appearance of bicuspid divided in half. The canines present cuspal atrophy. The first and second bicuspid is missing. The second deciduous molars persist, and are interesting

Nursed by artificial means, the patient has always been sickly. When a child he looked like a little aged man, with a wrinkled face, a hoarse voice, and slow movements. Later he had eye trouble, which is still persisting, spots on the skin, and osteocopic pains. The eruption of the teeth was very tardy. At present he appears very emaciated. The osseous development is very poor. The cutaneous development seems out of proportion with the deficient muscular bundles, which present no adipose tissue. The head is quite large in comparison with the development of the face, and makes the latter appear still smaller. The tongue presents a scrotal aspect. The testicles are atrophic. The eyes present

slight cloudiness, the remainder from interstitial keratitis; upon ophthalmoscopic examination the Antonelli rudimentary stigmata of the fundus of the eye are noted. The nose is very flat and large. The jaws are badly formed. The high and narrow palate presents the ogival shape.

Dental stigmata. The two central incisors slant forward, producing a form of upper prognathism. The teeth, which are all perma-

found, which is separated from the rest of the tooth by a deep circular groove, forming a kind of constriction of the tooth. The bicuspid are normal. The first molars are atrophied and small; they present a crown divided into two segments by a circular groove; on the occlusal surface caries of the first degree is noticed.

In the lower jaw the incisors are small and dwarfed, and present simple sulciform ero-

FIG. 17.



Cupolaform erosions.

nent and are thirteen in number in each jaw, the second bicuspid not having yet erupted, are large, irregularly set, more or less crooked, and with rather large interproximal spaces.

In the upper jaw the central incisors present important lesions, these incisors being rotated a little around their axis; their crowns appear divided into two portions by a deep circular groove. On the anterior surface the groove presents a slight upward convexity. The upper portion is rounded, smooth, regular, and quite normal; the lower is atrophied, rough, full of depressions, and of a yellowish-brown color. The canines are short and rounded; at their tips a pointed, conical stump of enamel of the size of a pinhead is

sion on the free edge. On the canines and first molars the same lesions are noted as in the upper ones.

CASE XI. O. R., male, nine years of age, with doubtless syphilitic heredity, as the father had syphilis three years before marrying. He passed the period of infancy fairly well. At the present time his general condition seems fair, the nutrition is good, and the osseous development is normal. He presents no osseous or testicular deformation, nor any trace of peri-anal or of peri-buccal scars, etc. Only rudimentary ophthalmoscopic and dental stigmata are present.

Dental stigmata. The patient possesses eight upper teeth and ten in the lower arch,

with marked microdontism and retardation in the eruption of the permanent teeth. It is already two years since the deciduous incisors were shed, but the permanent ones have not yet erupted. Only one, the central left incisor, is beginning to erupt; it presents on its free edge a well-marked linear groove and several pits (cupolaform erosions) of a grayish-black color which stand in contrast to the whitish-blue color of the neighboring tissue. The canines are carious. The deciduous molars on their anterior surface, besides small tortuous grooves, present several eroded spots of the size of a pinhead, somewhat circular in shape, extending as far as the dentin and having a dark color (calyx-shaped erosion). The first permanent molars are rather small, carious, and almost half destroyed. On the lower left alone are noted traces of a deep groove on the occlusal surface, with a small terminal tubercle of atrophic tissue.

CASE XII. B. V., male, fourteen years of age, of a syphilitic father. During the first years of life the patient had syphilitic manifestations of the skin and mucosæ (pemphigus, papules), which were cured by specific treatment. Later on he had a fetid ozena, which still persists. He is poorly developed physically and intellectually, has lanky, slightly curved legs; his walk is slow and dragging. The eyes and ears seem normal.

Dental stigmata. The dentition (see Fig. 17) is most characteristic. Some of the teeth, especially the upper central incisors and the lower canines, seem made to play domino with, presenting on the crown dotted cupolaform erosions, resembling dice. They are fairly well seated in the arches, except the left bicuspid, which have deviated to the right. He has twenty-four teeth, four of which are deciduous.

In the maxilla the central incisors present on the upper half of the crown numerous dotted small erosions, very close to each other, of a dirty yellowish-brown color. Almost all the enamel is absent, so that the dentin is uncovered to a great extent. The lower half presents two distinct lines of rounded, concave erosions, of the size of a pinhead and of a dark-brown color; these lines are perfectly symmetrical and are visible at a distance. In the first line four cupolaform erosions and in the second two very distinct and well-marked erosions can be counted, in a tissue of whitish-green color. The laterals have blunt angles and are of the shape of canines. They are grayish in color and show two pitted erosions near the free edge. The canines present the same lesion as the central

incisors. Only the two terminal erosions can, however, be distinctly seen, while the remaining portion of the crown appears almost entirely deprived of enamel and is of a dirty, grayish color. On the first molars a very deep sulciform erosion of a dark color is noted near the occlusal surface, which is atrophied, shapeless, and reduced to the smallest size.

In the lower arch the four deciduous incisors still persist. About the neck they present a grayish coloration, due to a loss of enamel. The two canines are very characteristic. In the upper half of the crown four small circular excavations are noted of a dark-gray color, running along two symmetrical and parallel lines, and forming the figure four of dice. The left canine is shorter than normally and has a chisel-shaped free edge like an incisor. The molars present the same cuspal atrophy as in the corresponding upper ones.

CASE XIII. M. A., female, four years of age, of unknown father. The mother contracted syphilis six years ago, with initial syphiloma on the inside of the lower lip. She had five pregnancies with three abortions, and one fully grown fetus which was born dead. The patient arrived at the termination of the fifth pregnancy. She was properly nourished for a year and a half, and began to walk about the twentieth month. The first teeth erupted at about the second year.

She appears emaciated, and presents a pale wan face. The skin is wax-like, thin, without traces of adipose tissue, and almost adheres to the bones; the extremities are atrophied, the trunk is skeleton like. There is a very pronounced ozena.

Dental stigmata. The patient presents twelve teeth, six in each jaw; the canines and the second molars are absent owing to a delay of eruption. The upper central incisors are dwarfed and present the characteristic crescentic notch on the free edge (Hutchinson's tooth). On the lower incisors simple sulciform erosions, and on the molars cup-shaped erosions are noted. Caries is generalized.

CASE XIV. B. B., male, eleven years of age. The parents deny syphilis, but the mortality in the family, the evident marks of infantilism, the ocular lesions (vascular remains of parenchymatous keratitis) and the dental lesions of the patient, tend to prove hereditary syphilis. The boy presents a nose flat at the base, he shows very little intelligence, and is backward.

Dental stigmata (see Fig. 18). There is congenital absence of several teeth (bicuspid,

canines, and molars). The boy possesses only five teeth in the maxilla and seven in the mandible; these are badly formed and set, are eroded, and have wide interdental spaces. Partial microdontism, anomalies of number, location, direction, and diastema between the incisors and canines are present.

In the maxilla the two markedly converging central incisors are of normal size, although beside the others they look like giant

cupolaform erosions. This line seems continuous at first sight, but on closer examination small intervening portions of almost sound tissue are found between the erosions. The bicuspid and first molars are missing.

In the mandible the incisors are small, badly seated and friable, and present two lines of small cupolaform eroded points, at the same level on the centrals and on a different one on the laterals. The left lateral incisor has

FIG. 18.



Cupolaform erosions. Congenital absence of teeth. Diastema.

teeth. They present numerous cupolaform erosions symmetrically arranged in several lines, which are dark and close together in the upper half, lighter in the lower half. Near the neck six or seven of these erosions can be counted, four about the middle of the free edge and two near it. The laterals are small, crooked, and divergent, and present the same lesion, which begins, however, at a lower level. The cupolaform erosion on these teeth presents the same linear arrangement, a dark color about the neck and a lighter toward the free edge. The left canine is missing. Between the right central and the right canine a large gap is found. On the canine a curved line is seen near the occlusal edge, formed by numerous small

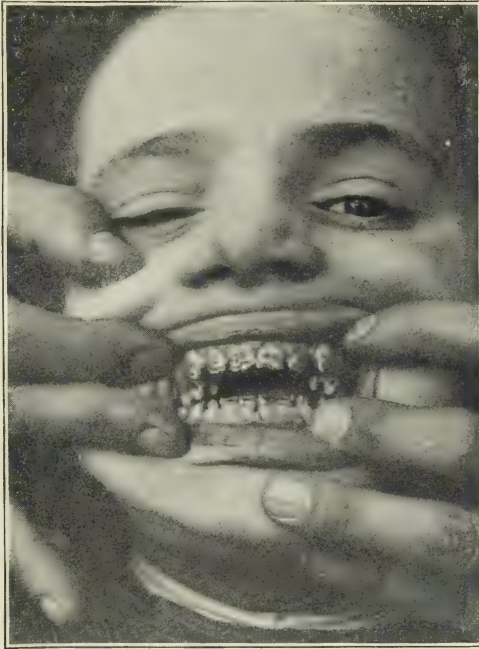
blunt angles and the shape of a canine; the free edge of the right lateral is not so badly worn away. The left canine is absent; the right one stands widely apart from the incisor and presents the same curved line as the upper corresponding one. The bicuspid and first molars are missing. The first molars are small, short, with a flat occlusal surface presenting no trace of cusps. The color of this surface is bluish, but the rest of the tooth, which presents two punctuated lines, is of a dark-grayish color.

CASE XV. M. N., male, twelve years of age. The father contracted syphilis a few years before marrying; the mother was immediately contaminated and had three mis-

carriages before giving birth to the patient. The patient's development has been normal, nothing remarkable occurring during his infancy; he did not even have the common exanthemata; merely the eruption of the teeth was a little delayed. At first sight nothing abnormal, no deformation of the skeleton is noted. He has a receding gumma on the left leg, a little below the internal tuberosity of the tibia. No alteration of the eyes, ears, or nose is noticeable.

mother has been conjugally contaminated and has had several abortions. Nothing is known of the patient's previous history. He is poorly developed physically and mentally and presents several marks of infantilism, especially in the genital organs. The lower limbs are lanky and bow-shaped. The nose is flat at the base, a fetid muco-purulent flow issuing from it. There is no alteration in the eyes. Purulent otitis media is found in the right ear, with a large perforation of the tympanic

Fig. 19.



Cup-shaped erosions. Seat-shaped lower canines. Malocclusion. Diastema.

The only hereditary syphilitic stigmata are the dental ones, consisting in partial microdontism and in anomalies of shape and direction. The teeth are rather small, irregularly seated in the maxillary arches, and with large interproximal spaces. The two upper central incisors present Hutchinson's crescentic erosion, the canines show several irregular white spots recalling the white marks on the finger-nails. The first four molars show cuspal atrophy with denticulate appendices on each tooth, beyond the groove of constriction. The other teeth present no alteration.

CASE XVI. B. B., male, fourteen years of age. The father died a few years ago; the

membrane and destruction of the ossicles, producing almost complete deafness. On the left almost the same perforation of the membrane is found, though without the purulent flow; the hearing is slightly impaired. The palate has the ogival form.

Dental stigmata. The teeth (see Fig. 19) twelve in each jaw, appear eroded, irregular, badly set and articulated, with anomalies in direction and form, persistence of the deciduous teeth, large interproximal spaces, and malocclusion.

On the upper teeth the cup-shaped erosion predominates. The incisors and first molars present arabesques, several sulciform and cupolaform erosions resembling hieroglyphics.

Only a small zone of enamel appears here and there, in the middle of large areas of exposed dentin. The color of the teeth is a dirty yellow. The centrals seem divided by a groove into halves. The upper part is almost entirely deprived of enamel, the lower half presents excavations and grooves. The free edge is very thin, transparent, and worn away. They are, moreover, crooked and convergent, the right one slightly overlapping the left. The left lateral incisor presents marked sulciform erosions; the right one in an oblique direction presents four sulciform erosions, which extend from the middle of the tooth to the occlusal edge, gradually diminishing, so that the tooth with its erosions and crooked appearance looks like a child's hand slightly curved inward. The canines are higher than normally, especially the left, which is separated by a space from the lateral and the bicuspid and placed above them; they present cuspal atrophy. The first bicuspid comes lower than the normal line; toward the neck they symmetrically present a rather deep oval excavation, almost black in color. The second bicuspid is normal in structure, but presents anomalies in direction. They are seated in the dental arch at a much lower level than the others, so that only they occlude and force the patient to keep the mouth open even during rest, on account of the resulting distance between the anterior teeth. In the lower arch a simple sulciform erosion is noted in the lateral incisors, which toward the occlusal edge is of a dark color; the centrals present a second one at about the middle of the crown; between these two lesions an area of sound tissue is present. The canines possess a most characteristic form, especially the left, of the shape of a small seat. The tooth is divided horizontally into two parts by a deep groove; the lower half is normal, of the upper half only posteriorly a small part remains, a square piece, which as it were forms the back of the seat. The atrophied part is of a dark-grayish color. The first and second bicuspid are absent. Their place is filled by the deciduous molars, which are small, clumsy, and eroded (cup-shaped erosion). On the permanent molars the same lesion is found. The second molars are missing in both jaws.

CASE XVII. S. G., male, fifteen years of age, of a syphilitic father who died a few years ago from trauma. The mother is living and healthy. The eldest brother died at a very young age; two other brothers are living and well. The boy says that his teeth erupted late and that he has always had eye

trouble. In his present state he shows a rather regular osseous development, excepting the nose, which is saddle-shaped. The nutrition is good and no cranial or facial asymmetry is noticeable. The glandular lymphatic apparatus presents nothing more than small enlargements at the neck and the inguinal region. Two gummata in retrogression are found on the right leg; another in a retrograde state is seen below the internal tuberosity of the tibia. The boy bears irregular white marks on the nails. In the eyes slight cloudiness is noted in the cornea, the remains of parenchymatous keratitis, and the ophthalmoscopic examination reveals very marked pigmentary atrophy of the choro-retina and convergent strabismus. The gums are red, swollen, and sanious. The mandible is deformed. The inferior border is like a cutting edge; the angles of the mandible are very marked, especially the right one, on which a small prominence of osseous tissue (hyperostosis) of the size of a pea is found.

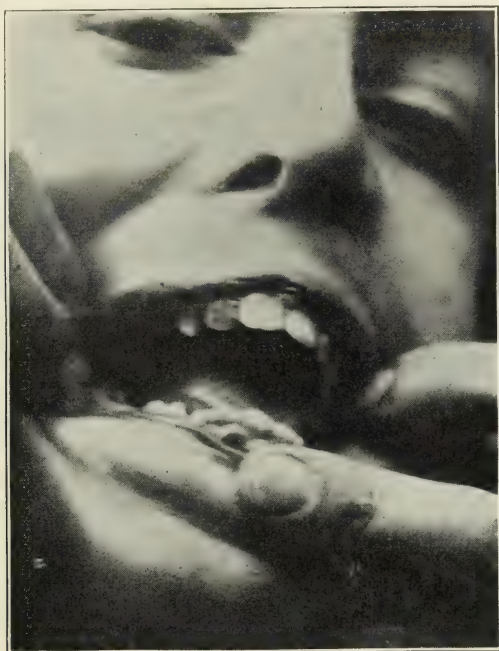
Dental stigmata. The teeth, twenty-eight in number, appear small, widely separated, transparent, friable, and worn away on the occlusal surface; they look as if they would break by merely looking at them. The upper central incisors, the canines, and the first molars toward the free edge and the occlusal surface, present white opaque spots, irregular in size, shape, and number. The surface covered by these marks is rough and of a gross texture. The other teeth are more or less carious, but quite free from any other alteration.

CASE XVIII. A. L., female, sixteen years of age. The father died of cerebral syphilis. The mother had four pregnancies, with two abortions and a child who, older than the patient, died in youth. Personal previous history: The patient has always had great difficulty in walking, being bow-legged. At three years of age she had a purulent flow from the nose of long duration, a fetid discharge resulting from it. The patient's intelligence is poor; the eruption of the teeth was normal. She is backward. Her present state shows that excepting the tibial malformation, which resembles a saber-blade, the osseous development is rather normal; the nutrition is good. The patient has a pale complexion and presents facial asymmetry. The eyes are sound. The nose is short with the end turned upward and slightly deviated to the right. The left naris is enlarged. There is deafness in the right ear and diminished audition in the left. The mouth is kept half open; the breath is fetid; the

breathing is panting and the inspiration insufficient. The lips appear striated, with several whitish bands crossing one another. A long angular band extends almost from one zygoma to the other, touching the upper lip. The palatal vault is narrow, ogival, and presents an oval perforation of the size of a cent piece, situated a little to the left, near the median line, due to a palatal gumma in a retrograde state. Near the tip of the tongue,

is very characteristic, especially on the upper incisor. Between the lower second bicuspid and the first molar on both sides a gap exists due to the loss of the second deciduous molar, which occurred a few months ago. Anterior prognathism and malocclusion are present, but no erosion on the central incisors, the canines, or the bicuspid. Only the first molars present a cuspal atrophy, consisting of a deep circular groove which divides the

FIG. 20.



Cuspal atrophy of molars. Syphilitic leucoplakia.

a little to the right of the median line, a white milky area of local stellate leucoplasia is noted, with a rather large central nucleus and several lateral rays. Two more small opaline spots, round and somewhat larger than a pinhead, are found toward the right lingual margin, in correspondence with the second molar. The gums are swollen, of a bluish-red color, fetid and sanious; the gingival borders are detached, destroyed, and at several points are curled upward like buds.

Dental stigmata. The teeth (Fig. 20), twenty-eight in number, appear badly set, rather small, crooked, of a pale, transparent color, and of almost glassy appearance at the terminal part of the crown, and dark gray near the neck. This double coloration

tooth into two parts. The basal portion is almost normal, of a grayish color, the terminal portion atrophied, of a brown color and formed by two small buds of atrophic tissue.

CASE XIX. M. C., male, six years of age, of syphilitic parents. The father contracted syphilis twenty months before his marriage, and contaminated his wife at the beginning of the first pregnancy. She had two abortions each in the fifth month, and one fetus died at the termination of pregnancy. The patient appears small, sickly, and poorly nourished; his skin is wrinkled. On the child's trunk an eruption, very likely of syphilitic nature, around the lips linear scars and convergent strabismus are noted. The skull is large, asymmetrical, with parietal pro-

tuberances. The tongue presents the scrotal appearance.

Dental stigmata. The boy has only twelve teeth; the upper canines and second deciduous molars are missing. Sulciform, almost crescentic erosions on the free edge of the incisors are noted, and cup-shaped erosions on the molars.

CASE XX. V. P., female, fourteen years of age. The mother was contaminated by her husband, and had multiple syphilitic manifestations, of which she bears visible traces. She had five pregnancies, with the following

interesting. The patient has ten teeth in the maxilla and eight in the mandible. They are irregularly set in the dental arches and widely separated, appear friable, glassy, almost transparent, and of a whitish-blue color excepting the atrophic appendices of the incisors, canines, and molars, which are darker. Retardation in eruption, caries, congenital absence of some teeth, and large interdental spaces between the lower canines and molars are noted.

In the maxilla the two central incisors have an almost cylindrical shape, they are somewhat crooked, directed forward and inward,

FIG. 21.



Hutchinson teeth. Cuspal atrophy of canines and molars. Multiple sulciform erosions. Diastema.

results: (1) Abortion in the fifth month. (2) Abortion in the seventh month. (3) Child born before termination of pregnancy, and dying after two days. (4) Child living at termination of pregnancy, but who died very young. (5) The girl to whom we are referring. This mortality is of great significance in the family history.

The anamnesis is very faint. The patient was nursed at the maternal breast and developed very slowly. When three months old she had buccal and vulval mucous patches, and later on had eye trouble for a long time.

Present state: The patient has a large, almost natiform cranium, with parietal protuberances; her nose is very large and flattened at the base; her ears are badly shaped, with otitis media purulens on the left with a diminution of hearing. The frontal veins which are strongly developed form large bluish bands. The patient's intelligence is limited, and she has had nocturnal incontinence of urine. Remains of interstitial keratitis are found in both eyes. The deciduous teeth have erupted very late.

The *dental stigmata* (see Fig. 21) are very

a little apart from each other and rather convergent. On the free edge they present the crescentic notch (Hutchinson's tooth). The little band of terminal atrophic tissue is not yet worn away. The canines are rather short, clumsy, and large in proportion to the neck. They terminate in a small conical point of atrophic tissue, separated from the remaining part of the tooth by a deep circular groove. The second bicuspid are absent. The first molars are rather crooked, and present several small irregular tuberosities on the occlusal surface of atrophied enamel, separated from the sound tooth by a circular groove. The second molars have not yet erupted.

In the mandible the incisors present two sulciform erosions, separated by a zone of sound tissue. The canines show cuspal atrophy like the corresponding upper ones, but the atrophic terminal bud is already destroyed, and, while the left one presents a chisel-shaped occlusal edge like an incisor, the right one appears short, almost decapitated, and with a flat, smooth surface. The first and second bicuspid and the second molars

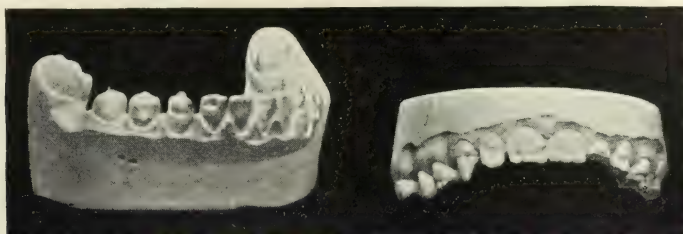
are missing. Between the canines and the first molars a gap is seen, recalling the similar space in the horse. The first molars present cuspal atrophy and very far advanced black decay. The atrophic tissue is almost entirely destroyed, and the tooth is assuming the tray-like shape.

CASE XXI. S. O., male, thirteen years of age, of a syphilitic father. The patient is of medium height, of normal osseous development, pale gray complexion, almost wholly deficient in adipose tissue and of poor muscular development. There is facial asymmetry,

the nose and ears. Last year she had a sternal gumma, which was cured by a good specific treatment. At present she presents a very large cranium, deficient osseous and muscular development, and a saddle-shaped nose. The ozena and the purulent otitis media are cured. Upon otoscopic examination, perforation of the tympanic membrane on both sides is noticeable. Audition is almost normal. Nothing abnormal is found in the eyes excepting a granulomatous conjunctivitis. The patient's intelligence is limited.

Dental stigmata (see Fig. 22). The patient presents twelve teeth respectively in the max-

FIG. 22.



Cup-shaped erosions.

cranial deformity, and a left frontal protuberance. The large irregular tibiae are sore on pressure. The ocular lesions consist in traces of interstitial keratitis, and the ophthalmoscopic examination reveals undoubted signs of pigmentary retinitis.

Dental stigmata. There is congenital absence of several teeth and a persistence of the deciduous teeth. The teeth are badly shaped and set widely apart. The central incisors are irregularly set, narrow at the neck and large at the base, with a crescentic notch (Hutchinson's tooth) on the occlusal edge. The canines present a slight cuspal atrophy. The upper and lower bicuspid are absent; the second deciduous molars persist and present a marked cup-shaped erosion. The first permanent molars are almost entirely destroyed by a central black decay, so that the cuspal atrophy cannot be distinguished. The lower incisors present slight depressions and asperities (cup-shaped erosion) on the free edge.

CASE XXII. C. A., female, sixteen years of age. Three brothers died in youth. The patient's development was slow and tardy. When two years of age she had buccal and vulval mucous patches and later eye trouble for a long time, and a purulent flow from

illa and mandible. Congenital absence of the first permanent molar on each side, polymorphism and large interdental spaces. In the upper arch the left central incisor presents a sulciform and not very deep semilunar erosion, and two vertical incisions on the occlusal edge. The right central presents the same sulciform erosion; it ends, however, in two rather deep cupolaform pits. On the free edge, the atrophic tissue which is found between the vertical incisions begins to scale. The left lateral is reduced to one-half; it ends in a flat surface of a yellowish color. On the right lateral a sulciform erosion is noted about the middle of the tooth, and a large excavation extending to the free edge of the tooth. The tooth is almost entirely deprived of enamel. The left canine presents a sulciform, semilunar erosion, laterally ending in two depressions. On the right canine a long atrophic appendix is noted, having the shape of a tongue, and separated by a deep circular groove from the base of the tooth. The same lesion is found on the left first bicuspid, only that the atrophic appendix of this tooth is double. On the right bicuspid the lesion is less marked.

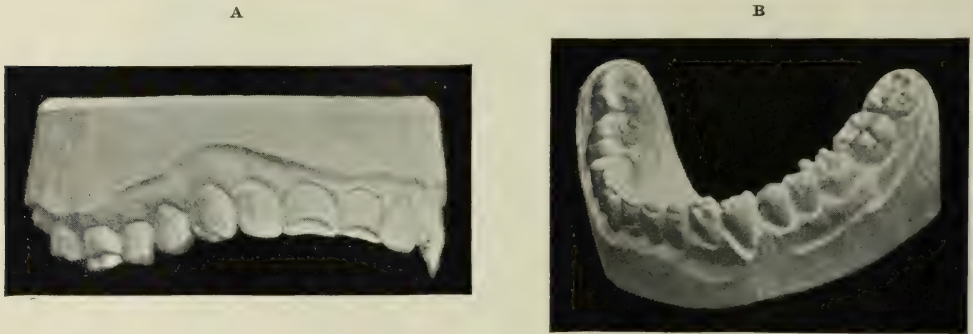
In the lower arch we note cupolaform erosion on the incisors, this lesion being specially marked on the right lateral, and a very char-

acteristic cuspal atrophy of the canine and of the first bicuspid.

CASE XXIII. M. S., male, age eight years. The father contracted syphilis three years before marrying. The mother is an hereditary syphilitic, and has had three abortions and one stillborn fetus. The patient was born before the termination of pregnancy. He presents a whole series of malformations with the following stigmata: Delay in walking (he began to walk at three years and a half); retardation in the eruption of the teeth (the teeth began to erupt during the third year); poorly developed intelligence; cranial mal-

erupted only at two years and a half, and the child had great difficulty in learning to walk. He is very backward mentally, and has not yet been able to learn to read. The osseous development is poor, and there is little adipose tissue; the skin is flabby and wrinkled, which gives him the appearance of an aged person, and a natiform head. He is backward, almost idiotic. His walk is uncertain, almost vacillating. The tongue, which has almost a scrotal appearance, shows longitudinal and transverse grooves. Ocular lesions: In the fundus of the eye the rudimentary ophthalmoscopic stigmata of Antonelli (pigmentary retinitis) are found.

FIG. 23.



Hutchinson teeth. A, Cuspal atrophy of canines and molars. B, Sulciform erosions. Cuspal atrophy of canines and molars.

formation; very pronounced frontal protuberances; high forehead; deformed thorax; unequal level of the eyes; saddle-shaped nose.

The *dental stigmata* in this case consist in malocclusion, typical dental deformities, amorphism, misplacement of the canines and upper laterals, cuspal erosions of the first permanent molars, absence of the bicuspid, and persistence of the lower right first deciduous molar with a cup-shaped erosion. The upper central incisors do not present Hutchinson's erosion, but small cupolaform erosions on the free edge.

CASE XXIV. Geo. L., male, nine years of age. Family history: The father died at thirty-nine years of age from progressive paralysis; he had been contaminated a year before marrying. The mother is living; she has had one abortion in the third month, two in the sixth, and one stillborn child. A girl, born before the patient, died a few months after birth. The patient was born at the termination of pregnancy, which was a difficult one for the mother. The first teeth

Dental stigmata. The patient has sixteen teeth, the deciduous teeth persisting; of the permanent set, only the first molars are present, the deciduous molars never erupted. The teeth are irregularly set. Microdontism is marked. The upper central incisors are convergent, and present the characteristic lesions of Hutchinson. The laterals are small and worn away. The lower incisors present on the crown three parallel grooves, crossing the four teeth at the same level (step teeth). On the canines we note flat carious cuspal atrophy, and on the molars, marked cuspal atrophy, with almost total disappearance of the cusps.

CASE XXV. N. N., male, of unknown parents. The family history, also the remote and recent anamnesis of the patient, are unknown. The osseous development is very irregular; the lower extremities are out of proportion with the rest of the body, and there is poor muscular development. The skull is narrowed laterally, and prominent toward the occiput. The face, rather wide, especially

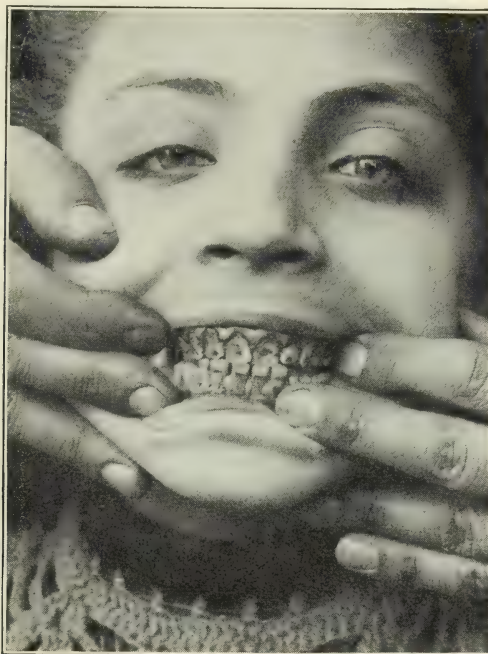
about the maxillary angles, is covered with hair. The nose is short and narrow. The eyes present marked opacities, the remains of interstitial keratitis. The patient is deaf and dumb. His tongue is reddened on the edges, and in several parts seems bare of epithelium. The gums are reddened and swollen.

Dental stigmata. The teeth (see Fig. 23) are all present, but irregularly set in the

In the mandible we find a sulciform erosion on the incisors near the occlusal edge and cuspal atrophy of the canines and first molars.

CASE XXVI. N. R., female, twelve years of age. The father is syphilitic, the mother healthy. Two abortions are recorded. The patient was born at the termination of the third pregnancy. She is poorly developed

FIG. 24.



Cup-shaped erosions.

dental arches. In the upper arch the two central incisors are prominent, producing a slight anterior prognathism. On the occlusal edge they present Hutchinson's incisors, with a thin terminal band of atrophied tissue, very transparent and ready to disappear. The left canine presents marked cuspal atrophy; the atrophied portion has disappeared, and the remaining one is of a darker color in the field of the erosion. Very likely the right canine has also been affected with cuspal atrophy; it now merely shows irregular sulciform erosions, one of which is semilunar, with a convexity toward the neck. The first molars on the affected surface present two shapeless, rugged prominences of atrophic tissue; each is separated by a groove from the base of the tooth, to which it seems attached like a shank.

physically and mentally, and has been very backward in walking and talking. She can hardly read after several years of schooling. When four years old she had eye trouble, with disturbances of sight. The nose is saddle-shaped, and the mouth open. She is under treatment for a suppurative gumma on the right leg.

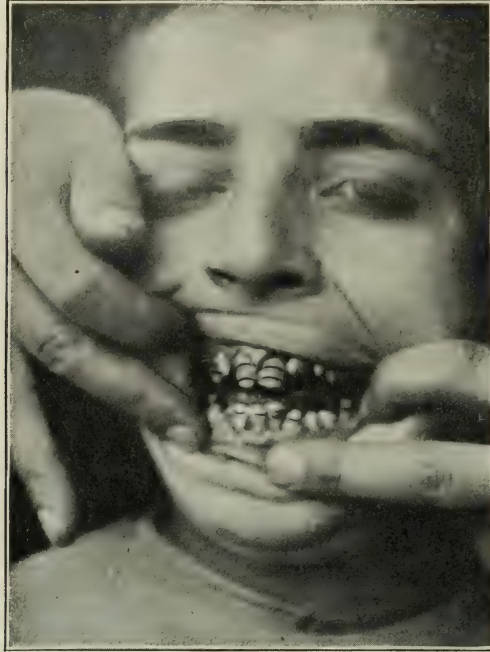
The *dental stigmata* consist in congenital absence of some teeth and persistence of the deciduous set. The teeth are small, widely set, but sound, and the upper incisors are forced slightly forward. On the first permanent molars cuspal erosions are noted with central caries. The second molars have not yet erupted. The lower bicusps are absent, and in their place the deciduous molars are found, presenting cup-shaped erosions.

CASE XXVII. M. S., male, sixteen years of age, of unknown father. Of the family history very little can be discovered. We only know that of five brothers four were born dead or died young, the patient alone surviving.

Present state: The patient is poorly developed, has a saddle-shaped nose, and small, sunken eyes. He exhibits interstitial kera-

lateral incisors appear slightly crooked and flat, the angles rounded. On the canines we note cuspal atrophy. The first molars are carious, completely deprived of cusps, and eroded almost to the gingival border. The lower incisors present two linear, deep, and parallel, horizontal grooves, extending almost from the middle of the crown to the free edge, which appears jagged like a saw.

FIG. 25.



Sulciform erosions. Cuspal atrophy of canines and molars.

titis, an arcuate right tibia, and is backward. Audition is completely destroyed on the right, markedly diminished on the left. There are small scars at the labial angles; the closure of the mouth is incomplete on account of bad articulation. Ogival palate and slight inferior prognathism are noted. The dental arches articulate only on the molars. The gums are reddened, swollen, and sanious, the breath is fetid.

Dental stigmata. The teeth are almost all in bad condition; they have a dark yellow color, and are irregularly set and wide apart. The mandible shows marked microdontism. The upper central incisors have a corkscrew shape; they are large near the neck, narrow toward the free edge, with the typical crescentic notch (Hutchinson's tooth). The

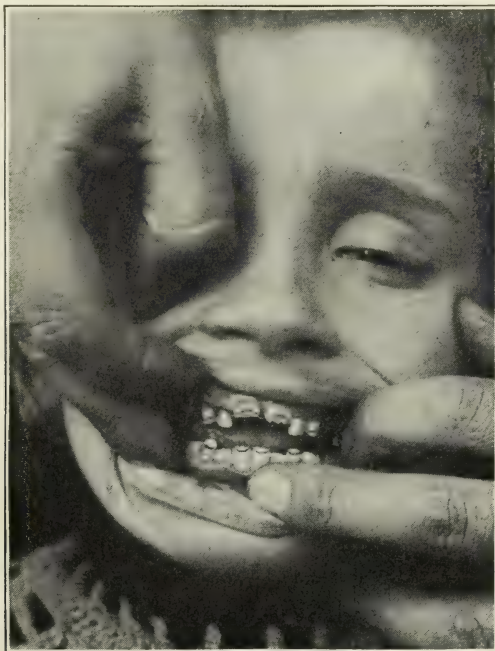
CASE XXVIII. R. T., female, age sixteen years, of a syphilitic father. When three years of age she had buccal, vulval, and mucous papules, which were cured by specific treatment. The patient was retarded in development, intelligence, and in walking. A few years ago she had two gumma on the right leg, the scars of which are still visible. The osseous and muscular development is poor, a cranial abnormality, *i.e.* occipital protuberance, a nose flat at the base, and infantilism of the genital organs being present. Upon ophthalmoscopic examination the eyes present the rudimentary stigmata of Antonelli. The gums are reddened, swollen, and sanious.

Dental stigmata. The eruption was tardy, the teeth exhibiting amorphism (see Fig. 24).

Judging by the yellowish color and the exceedingly numerous and large zones of exposed dentin produced by the sulciform, cupolaform, and cup-shaped erosions, one might say that the teeth are almost deprived of enamel. Excepting the quite normal lower first bicuspid, which are of a bluish color and which erupted only a few years ago, after the second bicuspid, all the teeth are eroded. Even on the second lower bicuspid and the first and

though the mother cannot give any reason for five abortions out of eight pregnancies. The patient learned how to speak and to walk only with great difficulty and very late. The eruption of the deciduous teeth was very slow. He is backward and dull, and during his earliest years suffered from parenchymatous keratitis, of which he bears traces. The patient's osseous and muscular development is poor; the skull is rather small as

FIG. 26.



Hutchinson teeth. Honeycomb erosions.

second upper bicuspid, cup-shaped erosion can be noted. In the upper arch the cupolaform erosions on the lateral incisors and canines and the cup-shaped erosions on the central incisors, bicuspid, and molars predominate. The sulciform erosion predominates in the lower incisors, which present two exceptionally good specimens, including a zone of tissue almost deprived of enamel, and on the canines, which almost possess the peg-like shape of Parrot. The upper and lower first molars present a cup-shaped erosion. The upper and lower second molars are missing.

CASE XXIX. A. C., male, fifteen years of age. The parents deny having had syphilis, al-

compared with the face. The left tibia is curved. Walking and speech are defective; the ears are normal. Ophthalmoscopic examination reveals the rudimentary syphilitic stigmata of Antonelli. The mouth is habitually open. The lower gums are reddened and swollen. The palate is ogival.

Dental stigmata (see Fig. 25). Twelve teeth are present in the maxilla and eleven in the mandible. There is a partial congenital absence of teeth, persisting in the deciduous set; partial megalodontism and also microdontism, and anomalies of shape, number, and direction; a grayish very dark color in the eroded parts, contrasting with the white color of the bicuspid; with delay of eruption.

In the lower arch, the central incisors are

larger than the others. They are convergent, and present almost a barrel-shape. Two deep sulciform erosions are seen, one crescentic on the free edge, another horizontal one higher up near the neck. Near the base of the tooth, beyond the second groove, the enamel appears elevated, especially on the right, where it seems to form a little protuberance. The laterals are small, almost dwarfed. The canines present cuspal atrophy, the tooth being divided into two parts and constricted, the terminal atrophied tissue resembling a small bud. The bicuspid are missing. The deciduous molars persist, and on them a honeycomb erosion is noted, especially on the second. The permanent molars are missing.

In the lower arch, the central incisors have two circular grooves; the left lateral presents only one; the right lateral is absent. On the canines, cuspal atrophy, similar to that of the corresponding upper, is noted. The first permanent molars have the shape of small columns supporting an ingot. They are narrow, long, rather conical, and constricted toward the apex by a large circular groove, and end in a conical dilatation of atrophic tissue.

CASE XXX. B. A., female, nine years of age. The causes of the parents' deaths is unknown. The patient is the only one surviving of five sisters, and has had a tardy development. Owing to a delay in speech she is still stuttering; she was also backward in walking, in the eruption of the teeth, in intelligence, and in movement. Two years ago she had eye trouble, of which she is not yet cured. She is small, lean, and almost crippled, and in appearance seems to be about four years old. The head is large, the forehead high, the nose flat at the base, the ears large, the mouth wide, with linear scars at the labial angles. The patient is very myopic. The eyelids are half closed, the conjunctiva is hyperemic; corneal opacities are present. The gums are reddened, swollen, and sanious.

The *dental stigmata* (see Fig. 26) consist in congenital absence of several teeth, persistence of deciduous teeth, spaces between the canines and molars, in irregular, eroded, badly set teeth, eight of which are in the upper and ten in the lower arch, and in a delay of eruption.

In the upper arch, the permanent central incisors are erupting; nevertheless, in the free edge a crescentic erosion (Hutchinson's tooth) can be clearly distinguished; this is of a brownish color, and delineates the upper, sound part of the tooth by a fine band of atrophied, glassy, and transparent tissue.

These teeth are somewhat apart and slightly converge. The deciduous laterals are normal. The deciduous canines present a sulciform, deep semilunar erosion with the convexity pointing toward the neck and involving almost half of the tooth, which is of a dark color. The first deciduous molar is absent, never having erupted. Between the canine and molar teeth a gap is noted. The second deciduous molar has the appearance of a honeycomb tooth.

In the lower arch, the central incisors have a very thin occlusal edge, which is transparent, notched, and ready to wear out, and separated by a linear groove from the rest of the tooth. It must be noted that the erosion is not found on the same level in both teeth, owing to the incomplete eruption of the right incisors. The two laterals, which are still in course of eruption, appear to be normal. In the deciduous canines, the same semilunar sulciform erosion is noted as in the upper corresponding teeth. The deciduous first molars appear like two white masses with a darker and perfectly flat occlusal surface; they resemble truncated quadrangular pyramids. On the second molars the cup-shaped erosion is noted.

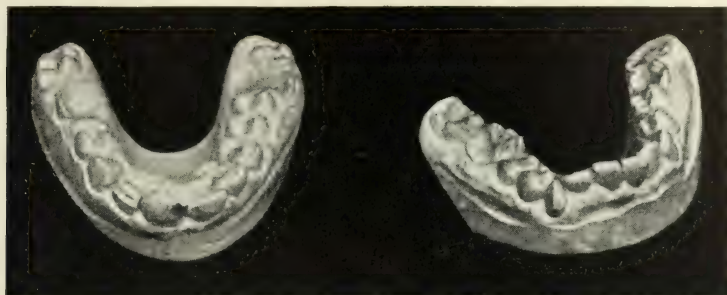
CASE XXXI. S. C., female, eighteen years of age. The family history is unknown. In the personal history of the patient it is noteworthy that she has several times undergone the specific treatment for syphilitic manifestations in the skin and mucosa. At the present time she appears poorly developed, underfed, delicate, and ailing. The head is of very large size, with rather pronounced frontal protuberances; the hair is fine and thin. The genital organs are atrophied. The legs have several scars of previous gummata. The eyes exhibit convergent strabismus, with diminished sight and opaque corneal spots. The ophthalmoscopic examination reveals the rudimentary stigmata of Antonelli. Around the mouth several whitish linear scars are noted. The palatal vault is narrow and ogival. The tongue presents a scrotal appearance, is largely deprived of its epithelium, and covered by transverse grooves.

The *dental stigmata* (see Fig. 27) in the twenty-eight teeth present are: Microdontism, malocclusion, and anomalies of shape, arrangement, and direction. In the upper arch, Hutchinson's erosion is found in the central incisors, sulciform erosion in the laterals, and canines. The bicuspid are normal, excepting the left second bicuspid, which is carious and almost entirely destroyed. The first molars are short and atro-

phied; the occlusal surface is entirely gone, and the crown is worn away almost to the gingival line. It is of a dark gray color. In the lower arch, the incisors are rather small, especially the laterals. The right canine presents the appearance of a grape-seed;

a nervous complaint, for the treatment of which he is assigned to a sanatorium. He is of a rather good physique and nutrition, and presents a large head and a saddle-shaped nose. The tibiae are slightly arched; characteristic gummatous scars are seen on the

FIG. 27.



Hutchinson teeth. Microdontism.

it is situated outside of the dental arch. The first molars present cuspal atrophy. The second molar is erupting.

CASE XXXII. G. B., male, twenty-eight years of age, of syphilitic parents. In infancy

left arm. The ears and eyes are normal. The eyes show the rudimentary ophthalmoscopic stigmata of Antonelli, *i.e.* grayish papillæ, a slate-like color of the central (peripapillary) region, and diffuse pigmentary atrophy of the choro-retina. The tongue toward

FIG. 28.



Complete congenital absence of teeth in the upper arch.

the patient was backward in walking, speaking, and in the eruption of his teeth. Between his second and third years he had only five or six deciduous teeth, which fell out after a short time. For a while he remained edentulous. At about his tenth year the lower first permanent teeth began to erupt, but he never had any upper teeth. For several years past he has been suffering from

the right margin presents several small white leucoplastic spots.

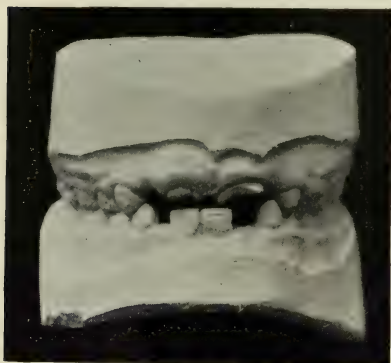
The *dental stigmata* (see Fig. 28) consist in a complete congenital absence of teeth in the maxilla. In the lower arch, fifteen rather strong and well-developed teeth are present. The first right molar is absent. A double sulciform erosion is found on the free edge of the central incisors and a single one on the

free edge of the laterals, also cuspal atrophy on the canines and the left first molars.

CASE XXXIII. G. L., female, ten years of age. The mother denies the existence of syphilis in the family, although she admits having had several abortions; but the characteristic wrinkled and aged facies of the child, the natiform head, the asymmetrical face, the delayed general intellectual development, the impaired audition, a slight deformity of the right tibia resembling a sword-blade, the sad-

tient is backward in development. When four years of age she was affected with parenchymatous keratitis, later complicated with another ocular lesion which is not defined by the patient, and which caused the loss of the right eye. At several intervals she has had mucous buccal and vulval papules, which were cured by the specific treatment, and one ulcerated gumma on the sternum two years ago. At present she appears pale, underfed, with cranio-facial asymmetries; the frontal protuberances, the zygomata, and the

FIG. 29.



Hutchinson teeth. Honeycomb erosions in deciduous and permanent molars.

dle-shaped nose, a characteristic gummatous scar on the right tibia, and the characteristic linear scars at the labial angles, all indicate hereditary syphilis.

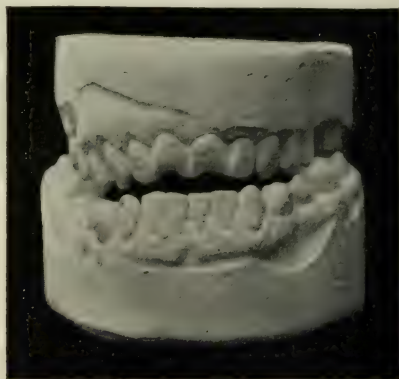
Dental stigmata (see Fig. 29). Twenty teeth are present, four of which belong to the permanent set. The upper and lower lateral incisors are missing. Their arrangement is abnormal, large interdental spaces existing between the upper and lower central and lateral incisors.

In the upper arch the central incisors present very well marked Hutchinson erosion on the free edge. They stand apart from each other, slanting inward, and converging, and are almost worn away to the gingival border. Cup-shaped erosions are noticeable in the deciduous molars and in the permanent first molars.

In the lower arch, the central incisors are shifted a little to the right, and the left central is somewhat overlapping the right. Cup-shaped erosion is present in the deciduous and permanent first molars.

CASE XXXIV. A. R., female, twenty-five years of age, of a syphilitic father. The pa-

FIG. 30.



Hutchinson teeth. Cuspal atrophy of canines. Absence of first molars.

maxillary angles are pronounced. She has thin, fine hair, and a nose that is flat at the base.

The ocular lesions consist in remains of parenchymatous keratitis in the left eye—white opacities. Antonelli's rudimentary stigmata of the fundus of the eye and a slate-like color of the central (peripapillary) portion of the choro-retina are distinguished upon ophthalmoscopic examination.

Dental stigmata (see Fig. 30). The palate is narrow and high. There is partial congenital absence of several teeth; the four first molars are missing. The anomalies of arrangement consist in a space between the second bicuspid and the second molars, excepting on the lower left side. The anomalies of direction consist in the lower bicuspid, excepting the second left one, being rotated on their axes by one-fourth of a revolution, so that they anteriorly present the distal instead of the labial surface. Malocclusion is present.

In the upper arch there are thirteen teeth; the first molars and the left third molar are missing. The anterior teeth are very narrow and slightly overlap. The central in-

cisors present Hutchinson's lesions. The canines show cuspal atrophy, with a small conical terminal bud. The third molar is very small, atrophied, and reduced to a small peg.

In the lower arch, the incisors and canines are narrow, crowded, and slightly slanting inward. There is diffuse caries in the bicuspids and molars. The left second molar is covered by a gold crown.

FIG. 31.



Hutchinson teeth. Cuspal atrophy of canines and first molars. Laminated teeth.

CASE XXXV. L. A., female, fifteen years of age, of a syphilitic father, who died several years ago. The mother had two abortions. The patient did not learn to walk until of the age of two and one-half years, and learned to speak even later. The first teeth began to erupt almost at the age of three years. About the fifth year she was affected with parenchymatous keratitis, from which white opacities still remain. Present state: The patient appears underfed, pale, tardy, and infantile. Upon ophthalmoscopic examination of the fundus of the eye the rudimentary stigmata of Antonelli are distinguished. Audition is normal.

The *dental stigmata* (see Fig. 31) consist in anomalies of shape, number, and direction,

delay of eruption (second molars), and partial congenital absence of several teeth (the two lower right bicuspids). She possesses twelve teeth in the maxilla and ten in the mandible. The upper central incisors are oblique and corrugated, and present the appearance of typical Hutchinson's teeth. Cuspal atrophy of the canines and first molars is present. The upper right canine is situated

FIG. 32.



Hutchinson teeth. Honeycomb erosions. Cuspal atrophy.

outside of the dental arch, and erupted only recently. The lower incisors present the laminate shape, and a space is found between the lower canines and the first molars on the right side.

CASE XXXVI. L. C., female, thirteen years of age, sister of the preceding patient. In the anamnesis, as in the case of the older sister, great backwardness is noted in walking, in speech, and in the eruption of the teeth. In her second year the patient had fetid ozena, which is still persisting, and in her sixth year she had parenchymatous keratitis, of which she still bears the marks.

Besides a pale complexion and poor osseous and muscular development, she presents

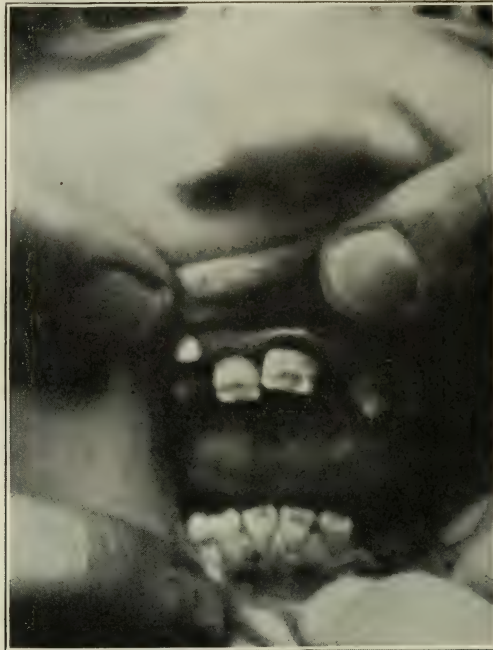
an asymmetrical forehead, prominent frontal eminences, a nose flattened at the base, and a slight sword-like deformation of the tibia. Nothing is found upon ophthalmoscopic examination, and the audition is normal.

Dental stigmata (see Fig. 32). The patient possesses twelve teeth in the maxilla and eleven in the mandible. She shows partial congenital absence of several teeth, namely, the upper canines and second bi-

Like her two sisters, the patient is backward, especially in the eruption of the teeth, and has had the same form of parenchymatous keratitis, of which some white spots are still found on the cornea.

At the present time she presents marked general infantilism, a large head, asymmetric face, and slightly saddle-shaped nose. On the tibia a characteristic gummatous scar is noted. Upon ophthalmoscopic examination of

FIG. 33.



Cup-shaped erosions. Diastema.

cuspid, and the lower first and second bicuspids, and persistence of the deciduous teeth—namely, the canines and upper molars. The eruption of the teeth was delayed. Hutchinson's erosion is observed on the upper centrals. On the canines, the permanent first and deciduous molars the honeycomb erosion is noted. The reader's attention is again called to this erosion, which is generally found on the deciduous molars, especially on the second molar. On the lower incisors the same crescentic notch is noted, on the canines and molars (first) the cuspal atrophy.

CASE XXXVII. L. O., female, eleven years of age, sister of the two preceding patients.

the fundus of the eye, Antonelli's rudimentary stigmata are found (slate color of the fundus of the eye).

The *dental stigmata* in this case (see Fig. 33) consist in anomalies of shape, number, direction, and structure; in partial congenital absence of several teeth—namely, the upper left lateral incisors, the lower left canine, and the four first molars; in tardy eruption, the bicuspids being still missing, in persistence of the deciduous teeth—namely, the upper and lower second molars, on which the cup-shaped erosion is noted, and in large interdental spaces. The teeth, seven in each jaw, appear irregular and badly set; they all exhibit cup-shaped erosion, especially the upper right lateral incisor.

Besides the foregoing thirty-seven cases of syphilitic dentition, the author has recently reported nineteen more such cases. Among these one case of syphilis of the third generation, or of *atavic* syphilis, is very interesting. The dental stigmata in this case are similar to those found in hereditary syphilis proper, or syphilis of the second generation, *i.e.* Hutchinson's tooth, cuspal atrophy of the laterals, canines, and first permanent molars.

CONCLUSIONS.

(I) In hereditary syphilitic subjects the following various dental stigmata are found: Erosions of the crown, cuspal erosion, and Hutchinson's tooth; white sulci; white marks; delay of development and eruption; dental infantilism; microdontism; amorphism; persistence of the deciduous teeth; anomalies of structure, shape, number, direction, arrangement, and color; vulnerability of the dental system; ectopia, total or partial absence of teeth, wearing away, premature caries, premature loss of teeth, space between teeth, diastema, and the following maxillary stigmata: Malocclusion, defective articulation of the dental arches, prognathism, ogival palate, and cleft palate.

(II) The dental stigmata are the most frequent, characteristic, persistent, and indelible among the stigmata of hereditary syphilis.

(III) The erosions are systematic; they occupy the same level on homologous teeth, and a different one on teeth of a different order. Besides, they have a marked predilection for some teeth (Hutchinson's erosion in the upper centrals, horizontal grooves in the lower incisors, cuspal atrophy in the canines and first molars).

(IV) The dental stigmata do not belong exclusively to the second, but are also frequently found in the first dentition. Some cases of dental stigmata in the third generation have been recorded.

(V) The cup-shaped or honeycomb erosion on the deciduous molars, especially on the second, is very frequent,

and we have generally found it in our observations.

(VI) The dental alterations as found in idiots, backward children, etc., represent a type quite different from those found in hereditary syphilitic subjects. Hutchinson's tooth, the systematic lesions, the horizontal grooves, dental infantilism, and the cup-shaped erosion in the deciduous molars, are peculiar to hereditary syphilitic subjects, while in idiots the vertical grooves and megalodontism are noted.

(VII) The dental stigmata are rarely found alone (we have observed only three out of fifty-six cases); they are generally associated with other stigmata of the head or with other general concomitant stigmata.

(VIII) A relationship between the factors of Hutchinson's triad, especially between the dental and the ocular lesions, is very frequently found.

In fifty-six cases of dental lesions we have found ocular lesions thirty-five times, and auricular lesions twelve times.

(IX) The anatomical and pathological examination of the dental follicles and of syphilitic teeth furnishes us with the following characteristic symptoms: Constrictions, which clinically correspond to the cuspal atrophies; alterations of the enamel and dentin, interprismatic spaces, interglobular spaces, rounded islands; granulations due to an inhibitory disturbance which acted upon the tissues during the period of development.

(X) In the dental follicles of macerated and doubtless syphilitic fetuses the following alterations have been found: Endovasculitis, perivasculitis, hemorrhage, and parvicellular infiltration.

(XI) The *spirochæta pallida* is abundantly found in the dental follicle near the so-called dentinal cap, in proximity to the vessels, and in their walls.

(XII) The dental stigmata depend upon a general morbid cause, which manifests its inhibitory action during the period of development of the tooth, *i.e.* the second half of intra-uterine life and the first months of extra-uterine life.

Such a morbid general cause can only be syphilis.

(XIII) The presence of vascular alterations and of the spirochæta pallida in the dental tissues leads us to believe that the dental stigmata are of syphilitic nature and not only of indirect syphilitic origin.

(XIV) The dental stigmata are of great importance for the diagnosis of hereditary syphilis, indicating the disease even before the appearance of other stigmata.

Hutchinson's teeth, the cuspal atrophy of the first permanent molar, the multiple systemic lesions of the second dentition, the multiple and systemic lesions of the first dentition, especially the cup-shaped erosions of the molars, are pathognomonic of hereditary syphilis. In twenty-three out of fifty-six cases, Hutchinson's tooth has been found.

(XV) The maxillary alterations although rather frequently found in hereditary syphilitic subjects, do not possess an absolute diagnostic value.

(XVI) The specific treatment is always to be suggested in hereditary syphilitic children with dental stigmata, even if these stigmata are found alone and unassociated with other syphilitic or dystrophic stigmata.

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THE IMPORTANCE OF DENTISTRY IN PREVENTIVE HYGIENE.

By Mr. HORACE FLETCHER, New York, N. Y., and Venice, Italy.

(Lecture before the union meeting of the Seventh and Eighth District Dental Societies of the State of New York, held at Rochester, November 14, 1908.)

MR. CHAIRMAN, LADIES AND GENTLEMEN,—I feel very much honored to be able to speak to an audience with whom I feel so much *en rapport* as I do with you. Dr. Van Vleck put into my hands last night a copy of the *Journal of the Allied Societies*, a dental magazine, in which I find a most excellent text for my address this afternoon. I am not going to read the whole article, but simply the caption, "Is Dentistry a Profession?" I would not have dared to ask this question myself at the present stage of the progress of dental science, but inasmuch as it has been asked by one of your colleagues, I may be permitted to take it as my text.

I believe it is not more than sixty or seventy years since the only dentistry practiced was done by the barber, and sometimes by the village blacksmith, because the man of the strong arm was better able to pull teeth than the less strong wielder of the razor. Teeth were often firmly rooted in the jaws, and consequently the blacksmith, by virtue of his muscle, was called upon to do the harder work in dentistry, leaving to the barber the lighter work, such as cleaning. While I was engaged in some special work at the laboratories of the University of Cambridge, Eng., some years ago, in the barber shop which I was accustomed to visit there hung the sign, "Teeth Scaled." The present occupant of the shop does no "scaling" of teeth, but still the sign remains as a reminiscence of what dentistry was but a few decades ago.

Starting at once from the text, and again asking the question, "Is Dentistry a Profession?" I want to give you my

most optimistic idea of what dentistry is best fitted to be, and what I think it will be considered within the next ten years. In all the prophesies I have made within the past twenty years (and I am quite a prophet), when I have said "ten years," my predictions have come true in five years. I believe that dentistry within the next ten years will be looked upon as the special department of the hygienic professions whose office will be the conservation of the front gateway of the alimentary canal in more ways than the mere care of the teeth. I believe that medicine, in relation to dietetics, will have become a curiosity of history, and that the human equipment for nourishment will be put under two special departments, the mental and the dental, both under the care of the D.M.D.

Some years ago I wrote an essay upon the combining of the two specialties of Medicine and Divinity. I prophesied that these two callings would eventually be merged into one; that it was quite necessary for the spiritual adviser to also be an adviser in hygiene, and quite as necessary that the doctor of hygiene should have some idea of the spiritual yearnings of the individual being treated. And this has come about—not as the result of my essay, because I did not publish it; still, at the same time, while I was writing the essay I was disseminating these ideas by wireless, and anyhow they were "in the air," and perhaps my note helped the suggestion to materialize.

Sometime, when I go to Boston, if I am happy enough to see Dr. Worcester, I am going to ask him some questions, and I expect he will reply to my ques-

tions in a manner satisfactory to the dental profession. I hope his reply will be, "When people come to me for mental consultation the first question I ask is, Have you a good set of teeth? If the teeth are not in a perfectly satisfactory condition, I want to know how bad they are, and I direct them to have an examination to see if there is any evidence of Riggs' disease, or if exuding pus is being swallowed constantly or not. I will make these inquiries because the tooth question and the question of therapeutics, either physical or metaphysical, are very closely connected." If he finds an imperfect dental equipment, he will advise the patient to go to a dentist for treatment if he is able to pay, or to one of the free dental infirmaries if he be too poor to employ a dentist.

The relation of the mental to the dental is this: You may create all the favorable suggestion you like, but unless you have a good set of teeth with which to masticate your food properly, in order to allow the juices of the mouth to get at it, or unless the teeth are in condition to munch your food comfortably and enjoyably, you are sure to have poor digestion. This has been shown conclusively by Pavloff and Cannon in experiments with which you are all probably familiar.

I am not going to give you a long dissertation on the method which I advise in taking food, because it has already been published so widely that you cannot have escaped learning about it. All of our study of the question leads in the direction, not of extending, but of simplifying our personal responsibility in the matter of our own nutrition. In considering a way by which simplification can be aided, Dr. Van Someran of Venice has suggested that we can profitably divide digestion into two departments, the *voluntary* and the *involuntary*. Voluntary digestion is that which takes place while the food is yet under control and before it is swallowed. The results of our experiments for the past ten or twelve years have shown that when food is properly treated within the small section of the alimentary canal under our voluntary control, we have no evidence,

apparent to the senses, that there is any more alimentary canal beyond the throat. We forget that we have a stomach, forget that we have intestines, and the whole process of involuntary digestion is done so completely and easily that we have no thought or care in the matter at all. What we want to do is to concentrate our attention on the things which are our own particular responsibility and let nature do her self-assigned part of the work uninterrupted, uninterfered with, and unquestioned.

Consider the complexity of that small three inches of the alimentary canal and how much of importance happens in and around the mouth! There is where nearly all the sensations are expressed. Nature does everything she can do to concentrate your attention there, where is enjoyed all the pleasure of eating and where she first protests if the act of eating has been careless. If there be trouble in the field of involuntary digestion, in the stomach or other intestines, it is in the mouth that the acids and ferments of indigestion are first observed. In the mouth we sense all the pleasure of eating; there is where is concentrated our consideration of true appetite, "watering of the mouth," and there is where nature has done everything to attract our attention; but man, with the perversity of a perverse child, has disregarded this evident advice, these beneficent precautions and allurements. We have ignored these attempts to concentrate attention upon this portion of the canal, and we have been groping for remedies to counteract the results of our carelessness in the dark recesses of the involuntary field. The medical profession has been directing our attention elsewhere, so that we have been roaming about in uncertainty and confusion over the thirty or more feet of the alimentary canal where we do nothing but mischief, and have utterly neglected the three inches which are our field of personal responsibility.

When I took up the study of this subject ten or twelve years ago—that is, concentrating my own independent thought on it—I went first to the books for information. I found, even at that time,

scores of treatises upon dietetics, every one of which was written, not to proclaim an undoubted truth, but to deny some other theory, and no two were in concurrence. Then I turned away from the field of dietetic speculation and opened anew my physiological text-book to review my study of the subject of years ago, and I found only a few pages devoted to the three inches of the alimentary canal which is our personal responsibility, but nearly three thousand pages devoted to what is supposed to happen after food is swallowed, beyond the field of our responsibility. It occurred to me, as a person who had had some experience with business, as a person having been taught to apply strict methods of analysis to business problems, "Is it possible that this important section of our anatomy, which is practically the protective gateway of our nutrition, the laboratory of our efficiency, has been carelessly overlooked in regard to its basic importance? Is it true that the scientific world has neglected this important tract so completely and has devoted so much time to working in the field which nature has reserved for her own responsibility?" I went over the literature of the subject and found that nobody had given an undoubtedly logical solution. So I took up the study of the subject myself, from a purely business point of view, and began to investigate the anatomy of the mouth and what takes place there. An account of my discoveries may be found in my earlier books.*

I concentrated my attention upon that one little section of the alimentary canal, the mouth, and I am now going to tell you what I think happens there. If you will follow me you will agree with me, I believe. I can best represent the mouth and tongue by the use of my hands. The hand, with the fingers, is a very good representation of the thin and thick portions of the tongue; this part [illustrating with the fingers] representing the flexible portion. The palm of the other

hand may represent the roof of the mouth, the hard palate, and the fingers of this other hand may also serve to represent the soft palate hanging down like a curtain behind the tongue when the mouth is closed. It has been found that during the process of mastication the buccal pouch (the mouth) is an hermetically sealed cavity. This can be easily tested by filling the mouth with air and breathing while the cheeks remain inflated. If the closed mouth were not entirely shut off from the air-passage behind it, the air would be drawn out of the mouth. This may not be relevant to our subject, but it shows that there is an air-tight gate at the back of the mouth and that during the entire process of mastication the mouth is an air-tight cavity. Food is taken into the mouth and the process of mastication and insalivation begins. The tongue moves about and pushes the food between the teeth and up against the roof of the mouth. Mixture of saliva with food causes a chemical transformation which gives us taste. As insalivation progresses the food becomes alkaline, or neutral, or whatever is necessary to make it acceptable to the body. There is a furrow in the center of the tongue, and when the food becomes liquefied it crawls up the furrow until it comes to the gate of the throat in the region of the circumvallate papillæ. If it is in a condition acceptable to the discriminating sense, which I believe is associated intimately with the circumvallate papillæ, the closure is relaxed, the soft palate hanging down behind the thick part of the tongue acts like the sucker of a pump, and draws the chemically transformed food material back for swallowing.

It has been shown by Donders of Bonn University, and by Higgins and Heger of Brussels, that there is a negative pressure behind the food-gate all the time during the treatment of food in the mouth, ready the moment there is a relaxation of the muscles which close the gate, to set up a suction and start a reflex of deglutition. It is by this means that the process of what I have called involuntary swallowing is started after mastication has been performed in the

* "The New Glutton or Epicure." The Frederick A. Stokes Company, New York, N. Y.

right manner. I want to say also, in this connection, and to offer it as something new to everybody I meet, that with the head held upright it is just possible to swallow, but only with difficulty. If you raise the chin a little you cannot swallow without making quite an effort; and if you raise the chin a little higher you cannot swallow at all. Whereas, if you lower the head with the face downward you will find swallowing easy. The inference is that sometime man went on "all fours," and took his food in that way, unlike the giraffe that can eat things off high trees and swallow with the head held highly aloft. This is merely a curiosity of our structure.

Suppose you take your meal (a piece of dry bread, for instance) with your head down; when you begin the process of mastication you can feel the saliva mixing with the bread until finally it becomes very creamy and sweet. When it attains that state, you will note that it begins to crawl up the concavity of the tongue, "runs up-hill," as it were, against gravitation, and when it arrives at the vicinity of the circumvallate papillæ there is a slight sensation of contact, an inclination to open up the gate. This is the important discriminating apparatus and function which I claim to have discovered, and which I have named "Nature's food filter." Unless forcibly prevented by the will, the gate then opens, and the food is drawn back by the negative pressure behind it (suction), and the reflex of deglutition is set up and completed. At this moment the larynx is brought forward under the base of the tongue for the protection of the air-passages, the pharynx is brought into convenient place, and peristalsis follows.

An interesting part of what I have described and the part to which I would call your attention for consideration as professional men is, What is the relation of the circumvallate papillæ to the opening and the closing of the food-gate? My own inference in the matter is that, while there is any taste left in a morsel of food in the mouth the closure remains, but with the disappearance of taste there is a report sent to the brain by the nerves

surrounding the circumvallate papillæ that the chemical transformation is completed; the message is sent to the brain through the nerves connected with the muscles, and a message is sent back for the gate to open, and the process of deglutition is begun. This is the process called "involuntary swallowing."

Now, I want to tell you that ten or twelve years of careful attention to observation of this discriminating process and to the avoidance of swallowing anything that does not *swallow itself*, using the filtering apparatus as nature intended, has resulted in the disappearance of all disabilities of digestion. If anyone will for a week or ten days carefully use the filter-function in the way I have recommended, eating only food which appeals to the appetite, faithfully masticating or sipping it; swallowing nothing except by the involuntary process; ceasing to eat when no longer actually hungry; discarding anything that is not swallowed involuntarily, the filter-function will be sensitized so perfectly that it can be trusted to work automatically. But at this point do not think that your responsibility has ceased. Whereas chewing and care are important, the one thing of greatest importance is the mental attitude toward the food you are eating and your mental state during the time the food is being digested.

Those of you who have followed Dr. Cannon's experiments during the past ten years have learned from his report of them that the mental state may either accelerate the process of digestion in the alimentary canal, retard it, or even stop it entirely. To illustrate this I will give you a brief description of some of Dr. Cannon's experiments, which will no doubt be interesting in this connection. He uses cats as test subjects. He could not study the process in man because the head of man is altogether too opaque ("thick-headed") to get the X-ray light through it; and besides, the use of the X ray is very dangerous. The alimentary canal of the cat is luminous to the X ray throughout. The food is mixed with subnitrate of bismuth to render it opaque to the X ray. Professor Cannon allows

his cats to become very hungry, with the appetite unusually strong. Then he selects the food his cats seem to like. Before giving it to a cat the food is covered with subnitrate of bismuth, and consequently when it passes into the stomach through the gullet, the shadow from the X ray tells what is happening on the way. I have watched the process, and it has been pictured by the photographic method. The cat, in not having much on its mind except the desire for something to eat, is fulfilling all the demands of nature that are required. There is first of all a strong appetite, and when the cat takes food, he is pleased with the enjoyment of it, and is thus fulfilling the psychic requirements of his nature. As he swallowed the food we watched the shadow as it went down the esophagus, hastened by peristalsis, and all this time the cat was lying on the fluorescent screen, contented and happy, as if before a log-wood fire. He was in a fine frame of mind and began to purr. During the purring the food was on its way into and through the stomach. Finally, as the food came to the pyloric orifice (the back-gate of the stomach) it began to hesitate a moment, then all at once we saw a small portion go through the opening, while the rest continued moving about and around the orifice. Then more of the food went through, and the process continued until all had left the stomach.

When it came to the duodenum we commenced to see the process of assimilation pictured by shadow. The papillæ conniventæ are seen to reach down and pick up the digested particles of food, and this goes on at something like the rate of five hundred dips a minute while the cat is still purring and happy. Then, for the purpose of experiment and not through mischief, the cat's attention is distracted, and at once the movement slows up. The cat is further irritated, and immediately the whole process ceases; everything becomes rigid. It is paralysis of digestion due to mental influence. If we restore the amiability of the cat—if it is made happy and the purring begins again—mind you, the process of di-

gestion does not immediately resume; it takes considerable time before ordinary digestion commences again. Moreover, when the digestive process is resumed, it is less active than that which takes place before the irritation is imposed. What is the result of this? The moment the digestive juices cease to flow, the bacteria of putridity in the alimentary canal are given a chance to do their deadly work. They begin at once, and that means trouble. They turn the inert food material, not into nutriment, but into poisons; the poisonous material is taken up by the blood and the lymph streams.

Now I will tell you how this illustration, taken from Dr. Cannon's researches, relates to ourselves. The same laws of nature which govern the digestive process in the cat affect us. If we take food in a hasty manner, without due appreciation of appetite and enjoyment, with our thoughts on business or on the catching of a train, and more particularly if we are irritated to the extent of having a "scrap" at the breakfast table, indulging in discussions about meals, business, politics, or anything whatever, we may be sure that during the time we are so doing we are manufacturing poison which is being sent through the body. I think I may illustrate the importance of the psychological influence on digestion by an experiment of Professor Pavloff. Professor Pavloff received the Nobel prize of \$40,000 last year for this discovery. He was able through his skill as a surgeon to sever the gullet of his dog test-subject so that the mouth was separated from the rest of the alimentary canal, and to the end of the severed gullet a rubber tube was attached. The dog was allowed to get very hungry. He was then given food, and ate it as a dog will do, but instead of the food going into the stomach it went through the rubber tube and back into the dish. In this way the dog kept on eating without satisfying in any measure his appetite. The moment he sensed enjoyment of the food being eaten a copious flow of the juices in the stomach was started, in anticipation of the food arriving in the stomach. This an-

icipatory flow went on the whole time the dog was eating and enjoying the taste of his food. Professor Pavloff now keeps many dogs busy four hours a day. He has syphoned the stomach through an artificial fistula, and during the time they eat they are each contributing to science and commerce three pints of gastric juice daily. This juice is bottled, corked, and then sold, and we may buy it to assist our own digestion. I may add that it is good stuff, for I have tasted some that Dr. Kellogg gave me, and you need not hesitate to use it. I had much rather take it from any dog than from *some* men! An interesting feature of this experiment is that it shows us how necessary is the enjoyment of food in the mouth to secretion of gastric juice in the stomach. If food be forced into the stomach of a dog directly through the lower end of the severed tube, without the enjoyment of eating, there is very little or no response from the source of gastric supply.

I have told you something of what happens in the mouth. If you get full enjoyment of your food through tasting it thoroughly, digestion will be perfect; and what is the result? This is very important. If you take your food in the manner I recommend—if you swallow only by involuntary swallowing (and it is only by these means that you can get keen enjoyment of your food); if you then stop when appetite slackens—you will find that you no longer are being reminded, through discomfort, that you have anything in the form of a stomach, and all the abnormal cravings which are mistaken for hunger will disappear entirely. These uncomfortable stomach sensations are merely pathological conditions in connection with indigestion, and are really in themselves forms of indigestion. Real hunger has nothing to do with “faintness” or “all-goneness.” If you take food in the manner intended by nature, and as I recommend, you will find that appetite is a perfect guide; it is the true language of the body. You may not know what proteid or starch is, or what food contains mineral salts, but appetite will lead you to the proper se-

lection from almost any available supply. The language of nature is not the language of calories, nor is it expressed in terms of proteids. If you take fifteen years to study the subject, as I have done, you will get farther and farther away from empirical knowledge and read the natural requirements in the instincts. Information can come only from nature. We have to get rid of false ideas before we can consider anything normally and with unquestioned respect. No doctor can tell us what best to do unless he tell us to read the instincts rightly and obey them faithfully. I went through the whole so-called science of the subject, and I assure you that nobody can tell any other body what to do.

Having learned this lesson, having taken food in the manner recommended, having satisfied normal appetite, what will be the result? You will find that health is secure and energy abundant. And why? You will have ceased to produce poisons in the body. You will find that one-half or one-third of the amount of food you have been accustomed to taking will better satisfy your appetite and will nourish you better—so much so that even thin people who are under weight will begin to gain weight on perhaps half the food they have been taking. And what is the reason? The reason is, that the body under this care utilizes everything accepted by it; expending energy on superfluous material will cease, and consequently it will be available for work or play. It is like finding pure water after having suffered from using water from polluted sources. When this is done, what is the result? The thing of greatest importance, which can only be observed and understood by the individual himself, is that there is now thorough digestion of food, right nutrition of the body, no putrid decomposition, no poisonous products, no offensive odors. The normal process in man, woman, or child is a cleanly process, a process which has nothing of offensiveness about it. Take the excretions of the body (perspiration, for instance, which in some instances is very offensive), they will become no more offensive than those of a babe. And

why? Simply because the products being excreted are not putrid, but merely the natural waste of healthy metabolism. I do not know of anything more satisfactory than having it within one's own power to be cleanly inside as well as outside, and if cleanliness inside is first attended to, outward cleanliness is a matter of course.

I have given you but an inadequate idea of the normal process of nutrition, but it reduces itself to this simple knowledge and formula: Never eat until you are hungry; never eat when in a disturbed state of mind; never allow worry, anger, or fear to possess you during the time you are serving on the holy altar of your nutrition—the source of your efficiency. It is clearly a sacred process; it means physical and moral cleanliness; it is the most sacred of duties. When you have done all that you can do to safeguard your nutrition, you may assure yourself that you will be always in the "pink of condition," whether you are an athlete in faithful training or not. You will find your energy enhanced, and your muscle endurance will increase from fifty to two hundred per cent. according to the room for improvement. You will cease to have disagreeable symptoms of headache or lack of energy. Fatigue will have practically become a thing of the past. Sleepiness will be the only symptom of fatigue. You will find that your muscles have improved, through having been given pure nourishment, to the extent, may be, of two hundred per cent. in their ability to lift weights; not by exercise but simply by the improvement of the quality of the muscle. You are likely to find that you may be able to lift easily and without resultant soreness twice the amount you have been able to lift while full of poisons. This is capable of easy demonstration, as has been shown by Mr. Stapleton, formerly of Yale University gymnasium, but now physical director of St. Luke's School, Wayne, Pennsylvania. At the time he was enlisted for the experiments under Professor Chittenden at Yale, five years ago, he went into them half-heartedly, because he felt himself to be already in

superior physical condition. But he soon found that his energy, strength, and endurance were greatly increased. This improvement, which amounted to a full 100 per cent. or more, came, not as the result of more training, but as the result of the improvement of the quality of the muscles effected by keeping poisons out of the body.

Mr. Granger, of the Battle Creek Sanitarium, as the result of only thirty days of following a right method of eating—and he was in good condition before he started it—was able to perform deep-knee bending (dropping the body down to the heels and lifting it to full height) five thousand and two times consecutively, which required two hours and nineteen minutes of unceasing dropping and lifting. He had never been able to go beyond three thousand dips previously, and on former occasions he had stopped because he could not go on. After thirty days of taking food in the manner recommended he was able to go five thousand and two times, and then he stopped because everybody detailed to watch him grew tired—as he expressed it, "I felt sorry for those people who were watching me." Then he ran down stairs and plunged into a swimming tank and felt no soreness whatever afterward.

I myself, as a matter of demonstration, am frequently asked to "make good." Arriving in this country some time ago, after having spent fifteen months in India and in the tropics around the equator, and after experiencing all sorts of adventures, without any systematic training at all, I was called upon to try a new endurance machine at the Yale gymnasium, the invention of Professor Irving Fisher. I went through the test, not realizing that I had accomplished anything remarkable, but I found that I had broken all previous records for this test. It was a fair test on my part because I was not expecting to break records, and I assure you that I felt no inconvenience after coming off the platform. I felt a little lighter than usual, and the next day expected to feel soreness, but did not. I simply give this as an example of a test for muscular endur-

ance. It has been demonstrated in many instances that this increased muscular capacity is purely the result of dietetic regulation, and it is within the power of everyone to make these experiments for themselves.

A MEMBER. You did not tell us how fatigue manifests itself: you told us how it would not manifest itself. Now tell us how it manifests itself.

Mr. FLETCHER. It manifests itself under ordinary conditions where there are poisons in the circulation.

A MEMBER. How does hunger manifest itself?

Mr. FLETCHER. By watering of the mouth. For instance, if you have been busy at work and have developed a keen appetite so that the fumes of corn bread being taken out of the oven will make you whinny like a horse, you may be sure you have a proper, a healthy appetite.

Many people think that the joy of eating consists in the act itself. Some say they do not want to adopt my system, if they have to give up all the pleasure of eating, but I answer that until they do so they will not know the full pleasure of eating! The chief enjoyment in regard to any pleasure is complete satisfaction—the satisfaction of having had all you want. Satisfaction is the acme of pleasure. You may enjoy the anticipation of a meal, and you may think that it is, like a good thirst to a toper, worth a great deal. When the time for eating comes you may enjoy the taste of your food greatly, but the greatest comfort and keenest pleasure is when you have satisfied the appetite and do not want any more. In other words, the acme of all enjoyment is not wanting. Hence, if you can arrange your eating so as to enjoy taste twice a day for thirty minutes, you can have full enjoyment of the maximum pleasure of complete satisfaction for the rest of the day; you have gained decidedly in economy.

Many have thought and declared that they never could spare the time that proper eating of food requires. In this

they are very much mistaken. During the time I was under test at Yale, taking the exercises of the 'varsity crew, and engaging in a great many other activities, it took me only from twenty-four to twenty-eight minutes a day to eat my food, and I was nourished fully, losing no weight, but on the contrary gaining slightly. Of course, while I was taking my sustenance I was not talking, but was attending strictly to business. The twenty-four to twenty-eight minutes a day were divided into two meals of twelve to fourteen minutes each, one at noon and the other at six in the evening, and I easily maintained full nutrition during this strenuous test. When a person becomes accustomed to using his digestive faculties he can nourish himself readily within thirty to forty minutes a day, and consequently there is no question of waste of time.

A MEMBER. I should like to ask whether you have special times for eating?

Mr. FLETCHER. I am not a guide for anybody, but I will tell you what I ate today. I took my first meal at 10.30 A.M.—after having worked with the utmost strenuousness from half-past three in the morning—and that meal consisted of a small piece of bluefish, hashed brown potatoes, two cups of milk, a little coffee in the milk and a great deal of sugar, say three or four lumps to each cup, a warm corn-bread muffin and butter. That is the only food I have taken today, and I think it will be quite late in the evening before I shall want my second meal. This may seem simplicity itself, but I do not know anybody who is occupied more strenuously than I am at the present time. This propaganda that I have become engaged in has brought upon me an enormous strain of work. It is the sort of work that no one can do for me, and beginning work as early as I do, I have to do all my own writing. Some years ago I wrote all of my manuscript by machine; paralysis in one hand compelled me to use the typewriter. Frequently I could use only one hand. I can assure you that it was a distressful condition of incapacity. Now I have

learned to use the pen double-handed. The last time I went to Europe, in the fourteen days that I was on the trip I wrote seventy thousand words by hand.

A MEMBER. I should like to ask if you take any meat in your diet?

Mr. FLETCHER. For myself, I can say that I have practically abandoned meat, because I like other things better. I discontinued habitual meat-eating in the first place because I ceased to want it, and in the second place because I do not believe it to be good for me—at least I seem better without it. Consequently, while I am not quite a professed vegetarian, I must say that all the arguments I know are in favor of the vegetarian diet.

A MEMBER. How about fluids with food?

Mr. FLETCHER. As far as I am concerned, I drink whenever I am thirsty. If I have thirst at the time I am eating I drink to quench the thirst, and have never had any bad results.

A MEMBER. How would your system affect the family hour for meals?

Mr. FLETCHER. I will tell you the plan we follow in our home in Venice. There is only one set meal, and that is served anywhere from twelve to one o'clock, because that happens to be the most convenient time for everybody to sit down and enjoy food. I will tell you also something with regard to a little grandchild, who is something of a curiosity as he was born since this system came into operation, and is being carefully observed. He is now five years old. He was nursed for the full term and only with the eruption of the teeth was he weaned. From that time on he has always chosen his own food. He is provided with a sufficient range of food to choose from, but he has limited it to two or three things. One is a sort of food that he calls "brown egg," material that

is rich in proteid, and the other is rice pudding, composed chiefly of starchy ingredients. He is asked an hour or so before his usual time to have his food, "What do you want today?" and he will answer, "I want my rice pudding." In that case it is evident that he has all the proteid supply he needs. Another time he will ask for his "brown egg," and at other times he will demand both. He is allowed to choose without any suggestion of choice whatever. He is the boy with whom Sir Michael Foster was acquainted and about whom Sir Michael said: "If the child is born at all and is not a monstrosity, the physiology of nutrition will have to be re-written." The child was born, and he is not a monstrosity. When three years of age he ate three times a day. Then, however, he showed a strong preference for play in the morning rather than for eating. The six months following he was in the habit of taking no food until twelve o'clock. Then he had his "rice pudding" or "brown egg," and nothing else until five o'clock, when he took his second and last meal of the day. As I have said, we have one regular meal at twelve or one o'clock, but there is always something prepared, and if anyone is hungry he may go to the cupboard and find something agreeable. That simplifies the question of household economics so much that our cook protested, because he feared losing his art entirely, and declared that he would not work where he did not get more practice.

Dr. HASKELL. There are a great many men whose work is removed from home so that they cannot take their noon meal with their families, and are only with their families at night; how would it work in a case of that kind?

Mr. FLETCHER. If one takes his food carefully, and normality of supply is attained, emergencies will mold the appetite-demand to suit convenience.

ORAL CONDITIONS IN CHILDREN AS CAUSATIVE FACTORS IN DISEASE.

By **W. F. HARRER, D.D.S.,** Montoursville, Pa.

(Read before the Susquehanna Dental Association, at Williamsport, Pa., May 19, 1908.)

THE problem of the maintenance of health, in its fullest sense, has assumed such an importance as to engage the serious attention of dentists who heretofore have manifested an almost complete indifference to the matter. If, as has been asserted, more than fifty per cent. of the people have some physical or mental defect which diminishes their sphere of activity and which was remediable during childhood, economic reasons alone would justify every endeavor to mitigate such a condition.

The limitation of disease has an economic and a hygienic aspect. Sociologists recognize it—by them the effect of disease is considered as a burden of society, while health adds to material well-being. Hygienists recognize it—to them disease is a menace to the community and must be eradicated. The recognition of this fact has resulted in legislation of a somewhat mandatory character, requiring that certain thoroughly established preventive measures, such as the vaccination of children, be complied with.

Sanative measures work for the public good. Any movement, therefore, having for its object the betterment of mankind is well entitled to favorable consideration. It may be said that this is the position assumed by dental practitioners who advocate frequent and systematic examination of the oral cavity in our public schools, together with such instruction in dental hygiene as the dentist only can impart.

At the outset, it may be remarked that such a measure necessarily would be optional with the community, and that it

would work no hardships to anyone. Naturally, some opposition might develop, but if the matter were presented so as to appeal to the intelligence of the people, the difficulties need not be insurmountable.

An educational campaign is necessary. The reasons why examination of the children is desirable must be clearly set forth. Articles interesting for the public journals should be prepared. In our talks with patients, the subject should be introduced and judiciously discussed. Opinions of school authorities and of teachers should be invited, and by cogent reasoning, diverse opinion, where it may exist, be reconciled and united upon this plan. And always let us remember that pluck, perseverance, and proof are a strong combination to win, be the issue what it may.

The purpose of this paper is to set forth a few reasons which may appeal to our judgment, suggest lines of thought, stimulate an interest, and possibly form the basis of fruitful discussion with our patients. In this, as in every endeavor, each person must utilize that which best lends itself to his purpose.

In sanatory science one idea stands out prominently, *i.e.* the causes of disease, their ingress, and the means for their prevention. Practical hygiene has this for its basis. It may sometimes operate in the reverse manner, but *the cause* is the objective point.

An epidemic in a school may break out; the school is closed, the building fumigated, the affected pupils isolated, and an investigation of the cause is made. In the effort to abate the epi-

demie, a number of individuals—those of expert knowledge, those in authority, and the caretakers—become actively engaged. The people are concerned because the epidemic is a menace to the public health.

But in all this we have commenced with the result, and worked backward to the cause. Would it not be wise economy to lessen epidemics by giving in a practical way a little more attention to the causes, at least to the predisposing causes?

Students of sanatory science have observed that many epidemics have their origin in the public schools, and that the initial sufferer is usually one with low vitality. The nutritive balance has been disturbed to such a degree that when the organism is assailed by antagonistic forces, its feeble resistance cannot overcome the onslaught, and it succumbs. Because of the heterogeneous character and the intimate association of the pupils in our public schools, the children of like weakened resistance succumb, and the epidemic is established, its virulence being dependent upon its extent, the environments, and the inherent resistive forces of the pupils. A rational procedure, therefore, in lessening epidemics would be to raise the standard of health.

Even from a purely educational viewpoint the plan we advocate has abundant justification. We are lavish with our expenditure for educational purposes, and we believe that the results more than warrant the outlay. We require the attendance of children at school. We provide excellent instructors and all the facilities, such as textbooks and appliances, but the principal factor in this educational problem is dismissed with no further thought than that of attendance for a specified number of days. There is of course the usual perfunctory report of progress—but everyone who has had any experience in educational work knows that more could be accomplished with the effort put forth if some attention were paid to the physical condition of our boys and girls.

An educator, Dr. Thwing I believe, in speaking of the adverse conditions under

which our schools are laboring, called particular attention to the physical defects of pupils. Among the various ailments with which children are afflicted, he mentioned four as the common causes for backward pupils, viz, defective vision, defective hearing, post-nasal growths or "adenoids," and bad teeth.

It is an indisputable fact that pupils are retarded in their mental development by these and other physical defects, consequently the necessity arises for examinations to be made by men competent in their respective professions, with a view of calling the parents' attention to these defects while remedial measures may still effect a cure.

If this were done, many cases of incipient tuberculosis or heart disease would receive timely attention. Would children with defective vision or impaired hearing be permitted to be handicapped for want of attention? Would thousands of children, having the typical expression of the "mouth-breather," whose mental growth is retarded and whose physical development is hindered if not actually deformed by the presence of post-nasal growths, be consigned to an unequal contest in life, simply because a comparatively trifling operation is necessary, a procedure requiring scarcely more than a minute!

Another problem, important because it underlies the very existence of physical being, is nutrition. It is fundamentally vital. It is the physiological basis upon which physical, mental, and moral development are dependent.

A well-balanced nutrition presupposes wholesome food and perfect digestive organs. Having these, with the proper exercise of the latter, normal digestion, absorption, and assimilation naturally result, and with normal excretory functions, the nutritive balance is maintained.

In this scheme of nutrition, nature has made provision for a thorough trituration of the food. The mechanism designed for the purpose is accurately adapted, and operates with a nicety and precision that is marvelous. For example, so exquisitely sensitive are the teeth to the

presence of hard matter between them that without conscious effort we are enabled to know whether the process of mastication is completed or not. That so little attention is paid to the obvious purpose of this sense is due, in many instances, to the habit of bolting food, acquired by children because of imperfect teeth.

Truth compels us to say that we do not take the time to acquaint our patients with the manifold provisions of the oral mechanism to secure us against ill health. As a result, the teeth are regarded, by many at least, as something in the nature of adventitious organs that sooner or later will be lost. The consequences of this mistaken idea can be seen in the children.

In order to ascertain what attention is being given to oral hygiene, a series of examinations were made by myself in our public schools. In all, 247 pupils were examined. For the purpose of noting progressive changes within certain age limits, the number was divided into three groups.

Of fifty-one pupils, aged six and seven years, but eight had absolutely perfect first permanent molars. Four had good deciduous teeth, three had theirs filled. Of a total of 1036 teeth, deciduous and permanent, 436 were defective in a varying degree. In twenty-five children, the number of defective teeth exceeded that of the intact ones. Eleven had putrescent roots. Congested gums were observed in many, and green stain in nearly all cases. Eight used the brush daily with good results, and four occasionally.

In the second group of children of from eight to eleven years, eighty-six presented the following conditions: Thirteen had good first permanent molars. Of these six had theirs filled. Eleven had one or more fillings in their teeth; sixteen showed badly broken-down molars; thirty-two had from one to nine roots, of which some were decidedly putrescent; in twenty-one the number of defective teeth exceeded that of the perfect ones. Of a total of 1781 teeth, 627 were carious. About one pupil out of seven used the brush daily and effectively. Congested

gums were a feature of this group, due undoubtedly to the effort of the erupting permanent teeth to dislodge unabsorbed roots of broken-down deciduous teeth.

In the third group of 110 pupils, comprising those from eleven to fifteen years, the following conditions were noticed: Fifteen had good first permanent molars, nearly all filled, as well as the full number of teeth for their respective ages. In every instance excellent care of the teeth was evident. Thirty-eight had one or more fillings in their teeth; in twenty-five, from two to four first permanent molars were decayed beyond help; nineteen had one or more of them extracted; eighteen had one or more putrescent roots. Of a total of 2616 teeth, 636 were defective. Congested gums and sordes were marked in many cases. The brush was used by a majority, but only occasionally, consequently with little result.

This is a brief summary of the notes of the examinations, and it conveys but an imperfect idea of the deplorable conditions that were found. Comment is unnecessary further than to state that those children who in early youth were taught the use of the brush and whose deciduous teeth received attention, bestowed diligent care upon their teeth as they advanced in years. Their mouths were healthy. Moreover, as far as could be learned, they possessed keen mental faculties. Their nervous system was not impaired from toxic infection resulting from "bacterial digestion."

There is a phase of disease-process made evident by this examination that I wish to emphasize, since the oral cavity occupies a most important relation thereto, and also because it involves a consideration of the causative factors in disease. The subject may be profitably studied by dentists.

Disease, from a bacteriologic viewpoint, may be regarded as a conflict of the organism with an invading army of germs. Either the organism will conquer, or having been weakened by continued toxic infection and being assailed by a terrific onslaught, succumb. Treat-

ment of disease therefore resolves itself into ways and means of assisting nature in overcoming the invading army.

Prevention of disease lies in the direction of intercepting the army before it has succeeded in invading the organism; or, if we fail in this, in so strengthening the outposts that no vantage ground can be secured. Continuing the metaphor, the mouth is an outpost, the most accessible as well as the most important one of the human body. Therefore, in the scheme of defense, eternal vigilance must be maintained at this spot.

It has been conclusively shown that all contagious and infectious diseases are due to vegetable micro-organisms, termed bacteria. While we have other micro-organisms, such as the yeasts and mold fungi, we are concerned with bacteria alone, with the exception of a yeast fungus—the *oidium albicans*—the exciting cause of thrush.

Bacteria require soil conditions suitable for their growth and reproduction. Under favorable conditions this reproduction may be very rapid. According to Cohn, one coccus in three days may produce the enormous number of 46,000,000,000,000. Miller has shown that in the mouth multiplication takes place with amazing rapidity, and that consequently the mouth may become a focus of systemic infection.

The studies of Miller and Vignal have shown that over twenty kinds of bacteria may be found in the mouth. Some of these are pyogenic bacteria, which are almost constantly present. In addition to mouth bacteria proper, the germs of specific disease, such as pneumonia, tuberculosis, diphtheria, the eruptive fevers and others, are occasionally found, and become an element of grave danger if the normal resistance of the body from some cause is diminished.

As already referred to, the health of the individual depends upon the maintenance of the proper equilibrium of cell activity and cell nutrition. If this be disturbed, the resistance is diminished. Such disturbance of the nutritive balance is frequently produced in the fol-

lowing manner: The cell function is inhibited by the absorption into the system of toxic products, either ptomains or toxins. Ptomains are the result of fermentive changes. They are putrefactive alkaloids, irritating either in the alimentary canal or when absorbed. Headache is the common symptom.

Any poisonous alkaloid of bacterial origin is a toxin. Being diffusible, these toxins quickly produce systemic effects, and because of their virulence death may ensue before any considerable dissemination of the pathogenic micro-organism, of which they are the product, has taken place. To these septic products great importance has been attributed in recent years, because of their bearing upon the etiology of disease.

Thus, with an unhygienic mouth as a culture medium for bacterial growth, we can readily see what the consequences must be. The food, in its passage through a filthy, germ-laden mouth, is literally loaded with bacteria. Usually in such mouths mastication, at best, is imperfect. The result, with an excess of bacterial life in the alimentary canal, is virtually the same as if the food were subjected to the action of the bacteria in a test tube. A "bacterial digestion," as Miller termed it, or putrefaction with the production of ptomains, takes place. Gastro-intestinal disturbance, often severe in character, is the local effect, while the systemic effect is various.

In the children examined a number gave evidence of toxic infections. They were pale, listless, apathetic, gave a history of headache, and were unable to cope with their studies. In some pupils, who were from one to three years behind their proper grade, actually repulsive conditions of the mouths existed. These unfortunates were being deprived of their measure of education, besides endangering the health of the school by reason of their susceptibility to infectious disease. Pathogenic bacteria, finding here a weakened resistance, may easily gain a foothold.

To be sure, the resistive forces, such as the phagocytic action of the leucocytes and wandering connective tissue cells,

as well as the germicidal character of some of the fluids of the body, usually destroy the invading micro-organisms; but when the principal resistive force—that is, some inherent quality of the cell substance and its ability to functionate properly—is impaired, as occurs with ptomain absorption, the contest becomes a doubtful one.

The relation of the oral cavity to diseases of the upper respiratory apparatus must not be overlooked. Associated with the mouth and adjoining parts are masses of lymphoid or adenoid tissue, which may become the seat of inflammation. Such large masses are the tonsils, having recesses or crypts. Throughout the pharynx are numerous crypts, the walls of which are surrounded with lymphoid tissue. These crypts are frequently involved. Across the vault of the pharynx a considerable mass of lymphoid tissue exists, termed the pharyngeal gland, which when hypertrophied constitutes “adenoids,” with their attendant evils.

Inasmuch as the action of pyogenic cocci produces local irritation, we can readily account for the subacute or chronic inflammation of the lymphoid tissue, and the resulting exudations that

are such a distressing feature in catarrhal conditions of the throat.

Within the limitations of a paper of this character, little more than a mere reference to a few disease conditions and their causation, as far as the mouth is a predisposing factor, can be attempted.

If the people are taught to understand the intimate relation existing between neglected oral conditions and faulty physiological processes; if the reasons for various ill-defined symptoms, collectively termed malaise, in the children be made clear; if they are shown that the virulence if not the frequency of epidemics may be lessened, the purpose we have in view will be gradually effected. We must adduce reasons—the thing to do is to set people to thinking; they will then realize that from the standpoint of self-interest alone, diligent care of the teeth, the deciduous as well as the permanent, will tenfold repay itself by greater intellectual achievements, by bodily vigor, and by probity of character.

Our purpose in promoting this cause must be largely altruistic. Unless we are willing to accept this view, we lay ourselves open to the charge of advocating a measure from ulterior motives.

HABITUAL MOUTH-BREATHING AND CONSEQUENT MALOCCLUSION OF THE TEETH.

By G. F. DeLONG, D.D.S., Reading, Pa.

(Read before the Susquehanna Dental Association, at its forty-fifth annual meeting, at Williamsport, May 20, 1908.)

EVERY era brings changes in all lines of thought and work, which must be followed if progression toward perfection be our aim. A little observation and reflection will demonstrate how well this thought applies to our profession. It is indeed very gratifying to us to note how each year brings about a closer affiliation of our profession with

the medical profession, and how these two are working together in greater harmony every day in order to solve the problems so essential for the preservation of health and the treatment of disease. This statement could probably not be better exemplified than by pointing to the close alliance existing between rhinology and orthodontia.

The author by no means wishes to be understood to believe that the problems to which his article refers have been solved; but doubtless a great deal was accomplished when the rhinologist came to recognize the relation between nasal obstruction and malocclusion of the teeth through enforced mouth-breathing, and when the dentist came to observe the symptoms of nasal obstruction and to know its invariable result as manifested in his field of labor.

I take it for granted that you are all familiar with the anatomy of the nose, in which term we include the passage leading from the external and visible part back to the naso-pharynx. I shall very briefly review some of the physiology of the nose, since by so doing it will probably be easier to make deductions. The nose has four general functions, respiratory, auditory, olfactory, and vocal. It is the first of these four functions that we shall consider in this discussion. The nose, not the mouth, is the organ which nature intends us to use in the first step of respiration, as is shown by the changes which take place in the air during its passage through this organ. The air entering the nostril is first filtered from dust and other foreign particles by the small hairs which grow in the vestibule of the nose. This filtering of the air is also accomplished by means of the moist mucous membrane, since through the ingenious arrangement of the turbinates all the air entering the nose comes in contact with some part of the membrane, which catches the dust, thereby preventing it from entering the lungs.

Inspired air is both colder and drier than expired air. The mucous membrane of the nose through a large blood supply secretes a great amount of fluid, which moistens the air, and it has been demonstrated by actual test that after normally inspired air has entered the naso-pharynx it has been warmed to almost the normal body temperature, so that when it enters the lungs it has been moistened and warmed.

The last function is a vital one, and one which alone renders it very desirable

that every individual should breathe through the nose. The mucous secretion has a more or less germicidal action. It has been demonstrated by Piaget that the posterior nasal cavity is nearly free from germs. He says that the mucous secretion is absolutely fatal to the anthrax and diphtheric bacilli, to some forms of streptococci and staphylococci, to the colon bacillus, and to some other germs. Lake had cover-glass preparations made from the nasal secretions of fifty tuberculous patients in whose sputum tubercle bacilli were present, and in only one case were tubercle bacilli found. I could cite quite a number of experiments showing the results of a similar germicidal action of the mucus of the nose. Normal respiration is always carried on through the nose.

Habitual mouth-breathing is the result of continued nasal stenosis. It is possibly incorrect to call it a habit, as it becomes a necessity where there is stenosis, but I employ the term "habitual mouth-breathing" to distinguish the results of permanent nasal stenosis from those of acute nasal stenosis due to acute rhinitis and to the presence of foreign bodies in the nasal cavity; also in order to emphasize what is implied in my subject, *i.e.* that, in my opinion, where there is continued nasal obstruction necessitating breathing through the mouth and extending to the age of puberty, malocclusion of the teeth will result.

Continued nasal obstruction may be caused by one or more of several pathological conditions, namely, hypertrophy of the pharyngeal or Luschka's tonsil, commonly called adenoids, hypertrophy of the faucial tonsils, hypertrophy of the mucous membrane on the inferior and middle turbinates, chronic rhinitis, polypi, and deviation of the septum of the nose.

The signs of mouth-breathing are so very evident that when one has once seen a typical case he can hardly fail to recognize the conditions thereafter. I am of the opinion that the earliest symptoms become manifest during the sleeping hours, as the irritated mucous tissues are more congested during that time.

Owing to the evaporation of the moisture of the pharynx, a dryness of the mouth and throat will be experienced on arising in the morning, often accompanied by a headache. A restless sleep, much tossing in bed, and snoring will be observed. The face is usually elongated, the bones of the face are underdeveloped, as the air-spaces do not have the proper circulation, the nostrils are small, the upper lip is short, and the patient will complain of a constant cold in the head. The face looks dull and expressionless, and where adenoids are present, owing to the closing up of the Eustachian tube, there is an improper balance of atmospheric pressure, causing impairment of hearing, and on this account school teachers will accuse children of being inattentive at school.

The sense of smell is oftentimes completely lost, the chin recedes, the roof of the mouth is high, the dental arches are contracted, and the teeth are in malocclusion. There are also digestive disturbances present, and the chest is flat or depressed.

As without doubt adenoids are the cause of more pronounced pathological conditions in and about the mouth than any other cause of nasal stenosis, they should be most seriously considered. On the posterior wall of the naso-pharynx, just back of the choanæ of the nose, there is normally a small amount of lymphoid tissue, consisting of round cells held together by a small amount of connective tissue. When this lymphoid tissue becomes hypertrophied and fills up the greater portion or all of the nasopharynx, nasal stenosis will result. It is a question not yet solved why this tissue should hypertrophy. Some authorities attribute it to heredity and others to malnutrition. Only a few weeks ago, at a joint meeting of the Reading Medical and the Reading Dental Societies, the essayist of the evening attributed it to improper ventilation and over-heating of houses. He made the claim that the excessively warm and foul air produces irritation on the mucous membrane and a consequent enlargement of this tissue. The cause given, while a new

one, seems to be very plausible. These excessive growths have been observed in children from three months upward, and usually disappear about puberty, but have still been observed in old people. Enlargement of the pharyngeal tonsil—adenoids—is usually accompanied by enlargement of the faucial tonsils. Hypertrophied faucial tonsils alone very seldom produce mouth-breathing, unless they are so excessively enlarged as to close up the entire oro-pharynx, which very rarely occurs.

When these pathological conditions of the pharynx are present there is only one remedy, namely, the removal of these organs by surgical means. There is no medicament which will reduce this hypertrophy, and no conscientious and competent rhinologist will treat the condition by therapeutic means, except in order to reduce an acute inflammation before operating.

Hypertrophy of the membrane covering the inferior and middle turbinates probably comes next in order of frequency in causing mouth-breathing. This membrane is very rich in veins, and is similar to erectile tissue, therefore it is very easily irritated and enlarged. As the air passes through the middle meatus of the nose it passes between these two bones, and we can readily see how an enlargement of the tissues covering these bones can obstruct the passage.

As the preceding causes of nasal stenosis are instrumental in producing more than seventy-five per cent. of the cases of mouth-breathing, I shall not take up the remaining causes, having mentioned them before in this paper.

It was at one time thought that with very few exceptions the form that malocclusion of the teeth assumes in sufferers from nasal stenosis was confined to the first division of class II (Angle's classification), namely, to a distal occlusion of the lower teeth and a contraction of the maxilla, accompanied by a protrusion of the upper anterior teeth. This was, however, a mistake. From my limited collection of models, I can show more cases in which the form of malocclusion of the teeth of mouth-breathers has assumed

the form of the first class than of all others combined. The case which I would present to you is that of a boy fourteen years old, in which we have an anterior protrusion belonging to the first class. The adenoids in this case were removed one year before the patient presented himself for orthodontic treatment, and a special effort had been made on his part to overcome the habit of mouth-breathing. Right here let me say that even after the cause of nasal stenosis has been removed, patients from force of habit will breathe through the mouth, and special efforts must be made on their part to breathe through the nose, often occasioning the necessity of wearing a bandage around the chin and over the head at night, as this is the time when they will persist in breathing through the mouth.

The greatest facial deformity occurs in cases coming under class II, division 1, in which there is an excessive protrusion.

I have never seen a case of malocclusion due to mouth-breathing which resolved itself into a third class case, neither do I know of any records of such cases.

Several theories have been advanced as to the factors which directly cause these conditions of malocclusion. I am of the opinion that malocclusion is due to a combination of several of the causes held responsible for it, namely, perverted muscular action and abnormal atmospheric pressure. I believe that the form which the malocclusion will finally assume is due to the particular time of life when mouth-breathing is established. Let me briefly state my reasons for these opinions. When the mouth is open, several muscles are put on tension, causing pressure on the upper and in some cases on the lower teeth. Without going into the anatomy of these parts, let me state that the buccinator muscles have perhaps the greatest influence in the molding of the arches. The buccinator and the orbicularis oris work in harmony, as may be observed in mastication by the pulling of the lips to the side on which we masticate, and to the orbicularis oris are at-

tached the risorius and the zygomatici major and minor, which cross in the molar region and are stretched when the mouth is open. The anterior part of the superficial portion of the masseter crosses the molar region from its origin in the malar process and zygomatic arch. The pressure of these muscles, while it is not very great, exerts a great influence in the molding of the arches, owing to the constancy of their action. It is generally known among dentists that the pressure of the orbicularis oris will force a labially erupted canine into position if there is room for its eruption, and when the combined actions of all the aforementioned muscles are put into play, they will certainly exert some influence for evil.

When the mouth is closed, the tongue lies against the roof, filling the entire oral space laterally, and must consequently be considered as a factor in preventing the buccal teeth from encroaching into the oral space. When the mouth is open the tongue lies on the floor, thus its antagonistic effect upon any of the factors causing contraction of the upper arch is lost, and it exerts its influence on the lower arch alone, which in very many cases is not at all contracted.

When the mouth is closed during normal respiration there is a negative pressure in the oral cavity and a positive pressure in the nasal cavity. The existence of a negative pressure in the oral cavity has been measured by an instrument devised for this purpose, and can also be demonstrated in the following manner: Close the mouth and teeth, then drop the mandible a fraction of an inch, allowing the lips to remain closed, and the cheeks will be drawn between the buccal teeth; if the lips are opened, a slight smacking sound will be heard, which is caused by the air rushing into the mouth to fill the vacuum chamber formed when the mouth was closed. The drawing of the cheeks between the buccal teeth in the first place was produced by the suction chamber present in the closed mouth.

This, I think, is an explanation for the high palate which we meet in some of

the cases of mouth-breathing. As before stated, normally a negative pressure exists in the mouth and a positive pressure in the nose, which tends to hold down the floor of the nose, which is the roof of the mouth; but in the mouth-breather the conditions are reversed—a positive pressure exists in the mouth and a greatly diminished or negative one in the nasal cavity, and we have a right to deduce that a high vault will thereby be produced.

Dr. Frederick S. McKay states that the cases of malocclusion resulting from mouth-breathing which are of class I present this form because mouth-breathing was established after the eruption and locking of the inclined planes of the cusps of the first permanent molars.

At about the age of five or six years the deciduous molars are considerably abraded, so that the occlusal surface presents almost a flat surface. The glenoid fossæ, in which the condyles of the mandible rest, are almost flat instead of cup-shaped, thus giving the mandible a wide range of movement, and allowing an occlusion which is not very well supported in one position. If we therefore have a patient of that age, before the eruption of the first permanent molar, who is a mouth-breather, the mouth is opened and in the effort to obtain air the mandible falls back. The first permanent molars erupt, but as the mandible is held back there is a lack of development, and the

condyles rest in the glenoid fossæ distally, causing the lower molars to occupy positions distal to normal when fully erupted and when in occlusion, establishing a case of the second class.

On the other hand, when the first permanent molars have erupted normally and have become firm in their alveolar supports before mouth-breathing is established, the inclined planes of the high cusps of the newly erupted teeth will drive the mandible into its proper position every time the mouth is closed, and the direct causes of malocclusion in mouth-breathing will produce an abnormal condition of the first class.

Since we know so well that malocclusion follows mouth-breathing, it becomes our duty to recognize a case of this kind, in order to be able to intelligently explain to the parent the pathological condition present and its serious consequences unless remedied.

The dentist sees children in early life, as they begin to suffer from toothache when they arrive at the age of three or four years. He has then an opportunity to watch for the symptoms of nasal obstruction, and to advise the services of a competent rhinologist, thereby doing credit to his profession, and at the same time elevating the authority of the dental profession in the opinion of the laity and of the medical profession.

I am indebted to the writings of Drs. Angle and Zeliska.

PITFALLS IN DAILY DENTAL PRACTICE.

By FRANK W. SAGE, D.D.S., Cincinnati, Ohio.

IF all beginners in dentistry were as worldly-wise as some are, there would be no occasion for such a paper as this. If all dentists, beginners and veterans in practice, would stop and think more, would try to exercise more their faculty of foresight, this paper would not

be required. In short, if we all fairly understood human nature in all its phases, we would not need to consult and advise with each other as to managing our affairs in practice. As it is, the dentist wakes up, after a year or two or several years of practice, to the discovery

that next to the mastery of his professional equipments a keen insight into the temper and disposition of his patients is indispensable to his success in practice.

In a number of ways the dentist just starting out is liable to lay nets for his own future entanglement. In a few years he discovers that instead of being engaged with new patients, daily performing new operations, in short, steadily making money, a large part, far too large a part of his time is being devoted to doing over work previously done, and possibly—quite probably—at a nominal charge.

Among the innocent instrumentalities contributing to this condition of affairs is the cement filling. Do not look surprised. The cement filling sows the seed of more misunderstanding between dentist and patient than perhaps any other single agency. If patients were always reasonable, it might not be so. Yet so it actually is. Let us consider an instance.

Miss A., stenographer, declares a preference for cement fillings in her front teeth, for esthetic reasons. She will some day have porcelain inlays at least, so she says; she cannot afford them now. You explain that cement lasts only a year or two, when it must be renewed, leaving her to infer you mean at her expense. If you could see into the actual workings of her mind, you would discover that she is dwelling wholly on the question of present expense, cherishing a hope that the fillings will last as well as gold; only she says nothing of this, nor do you suspect it. You forget all about Miss A. until four years later she phones, asking if you remember working for her last winter. Emphasizes the fact that all those fillings have come out; she will call at your lunch hour to see you about it. She calls. Not quite as pretty nor nearly so amiable, you instantly decide, as formerly. "I paid you \$9 for those fillings. What are you going to do about it?" (Gathering clouds, and mutterings of thunder.) You decide that inasmuch as Miss A. is a poor, hard-working girl, you will be reasonable, so you refill the teeth at half price. She explains that she came

unprepared to pay, not expecting to have the work done at once and that she will call in a day or two. She never calls, never pays. She goes a year or two later to some other amiable appearing dentist, abuses you, and pays him for gold fillings, because he happens not to be as amiable as he looks, and insists on gold or nothing.

What shall we do with such patients? I have for years made a practice of dashing off on my typewriter a little slip like this for the reminding of all patients whom I suspect may be hoping too much, not being impressed by what I tell them about cement and other temporary fillings:

This is to remind me that my dentist wished to use gold for filling my teeth, but that I preferred the cement, which he assured me would need to be done over in a year or two at most, he assuming no responsibility for its lasting.

(Signed) ANNA ANDERSON.

This I ask the patient to sign, and file away the carbon copy, signature and all. A patient must be very unreasonable and fractious indeed not to be brought up standing by having this slip produced at the right moment. I have found it very effective. Of course, if you have only wealthy patients who do not care what you charge, the case is different, but even wealthy patients are not always reasonable.

Here comes another patient, complaining of Dr. B., her late dentist, because his work does not last—cement, gutta-percha, inlays. Make her sign a paper. She will just as surely in due time abuse you, if you give her half a chance. "The dog that brings a bone will carry one away." The best of people will easily find fault with a dentist, as they will with a physician or a lawyer, but especially a dentist, unless he fights back.

Of recent years I refuse for the most part to make any but gold fillings—for patients of the complaining class especially. It pays to be firm with such people, even to the extent of driving them away. I believe it better policy many times to make gold fillings or inlays at

your usual rates, or on the instalment plan for certain poor patients, rather than to be annoyed by their complaints about cement. Nine patients out of ten, even intelligent and seemingly appreciative patients, are not impressed by your offering to do work below your usual rates because of their inability to pay much. They will not only accept the reduction, but will keep you waiting for your pay as inconsiderately as if you had done them no favor whatever. No doubt in the end they come to believe you never granted them a reduction.

There is always a chance, in case you use gold for a poor patient, of his or her fortunes changing for the better. Then you are remembered for your durable fillings, and the patient returns, perhaps paying off the old score.

The dentist needs to remember that patients do not enjoy coming to him—that they demand permanence in the work done. I hear dentists telling of experimental operations of one kind or another, blandly declaring that in case of failure they will try still another experiment. Patients are much less interested in teeth than dentists are, do not forget that. They do not care a picayune for the operation you take so much pride in—not for any length of time, certainly. They may smile, and seem to share your triumph, but they do not want to come back, no matter how enthusiastic you may be. They want to go back to the grocery, or golf, and forget they ever knew you.

I often say to patients whom I suspect of only half listening, "Now I think you are not impressed with what I am telling you. Let me repeat this," and I look them squarely in the eye, to make sure that they heed my words.

Another pitfall is the matter of engagements. Mrs. C. calls for an examination, makes an appointment for eight o'clock the next morning, casually remarking that you may expect her certainly the day after, if she fails to come tomorrow. Now, no matter whether you are doing anything or not, do not fail to call her back and put her right as to that. Women are innocently selfish and

inconsiderate, having usually no idea of business promptness, although there are many exceptions, of course. The dentist wholly fails in a duty to himself and his patient if he does not then and there fully explain that an engagement which binds him must bind his patient too. Nine times out of ten he will discover just there that women are generous, also, to a fault, when they come fully to understand the case. A lady will often say, "If you have a chance to work for someone else, do not let my engagement interfere." Yet many will show fight if you give their time, even five minutes of it, to another.

The dentist who would avoid misunderstandings and entanglements must constantly be explaining things to patients. It is poor policy to displease a patient, who may be a member of a family of patients, either actual or potential. So, of all things, firmly insist on rules as to engagements.

The telephone engagement presents unusually embarrassing difficulties for the dentist. After much considering of the matter I usually reply to a request by phone for a sitting, that I will give definite time for an examination, and will work at that time, provided some "tangible" case does not actually present in the office, beforehand, or at the same time. Yet upon any understanding, a dentist is liable to have half a day, or all of a day, as has happened with me, frittered away in examinations that yield not a dollar. (I should like to hear what you do with such cases.)

It is good practice to invite patients to call for an examination whenever they please. I often explain to patients the complications liable to involve me in loss through making appointments by telephone; then I always try to make examinations promptly, when they drop in. By explaining to the patient in your chair that you will do the same for him, when he chances to call for the same purpose, he is kept in good humor. Still, it is often hard to accommodate all comers, and this is one of the drawbacks in practicing dentistry.

I think it a good plan to enunciate

one's principles in practice to patients on suitable occasions. Thus, when an estimate is required, in advance, while I recognize a patient's right to know something, approximately, of the cost, I find it an advantage to announce my opinion that a dentist is entitled to a professional fee. Perhaps I would even say that I do not really care to figure very closely, where so much that is really indeterminate is involved, but claim a right to expect a good, round professional fee. I may even cite the instances in which my nextdoor neighbor, an eye-and-ear specialist, charges two dollars, five dollars, for a consultation. If a dentist fails to remind his patrons occasionally of his professional attitude, there is little danger of their thrusting a reminder upon him.

How to meet the patient who protests against a reasonable bill is a study in itself. You may argue half a day with some such people, to no purpose. Often a patient of this kind will be subdued most easily by a species of ridicule, such as is expressed in your saying, "I do not consider forty dollars much of a bill. I have done five or six times that much for some patients." I have occasionally completely floored an obstreperous patient by this simple speech.

Thrust out your chest and don't be mealy-mouthed, that is about the amount of it. Too many dentists know nothing of the meaning of the word *tact*. Here comes a woman obviously bent on picking a row with you. She comes at you with fire in her eye, assails you with words of denunciation and all but calls you a horse-thief.

Of course your first impulse is to get mad and talk back. But a better way is to say calmly, "Sit down, madam, and let us inquire fully into this. Sit down, please," and then you smile pleasantly, if not too greatly outraged. If you can smile anyhow, you are a general indeed, and will presently win your fight. Let her talk awhile, blow off steam, snort and blather. After she has worn herself out—which will not take long, if you only look patient, and keep still—you may venture to speak. Ask her what is wrong. Find

out if it is your fault; admit the truth, and make the matter right. It doesn't so much matter what you do, as long as you do not become angry. If you do the right thing now, she will be won over.

It is not a bad plan to write a note of explanation or of encouragement to a patient with whom you have perhaps had bad luck, time after time, by way of letting him or her know that you mean to do the fair thing. You fail twice or thrice in succession to get an inlay exactly right. This may happen in the case of some busy man who grudges every minute you require him to give for your service. Tell him in your note that you are not infallible; that you trust he will not become discouraged, and that you are pondering over some method for making a success of the undertaking. Many a patient is lost, through no fault of the dentist, for lack of some such assurance as a few sincere lines written to him may be made to convey. It flatters him to learn that you have his case deeply at heart, and he will forgive much.

Many dentists have too much of what the phrenologists call approbateness. They like to feel that their patients think them fine fellows, accommodating, genial, gentle in their ministrations, and all that. The truth is, it is far better to be firm with people, to make some of them afraid of you, than to be everlastingly suffering the consequences of not insisting on your rights. Don't let any patient neglect engagements without a word of admonition from you. Don't allow a patient to say anything derogatory to your honesty and integrity, without repelling it. A patient will sometimes say, half jocosely, possibly, "If you hurt me, I'll kill you!" It is well to reply promptly, "No you won't; I'll hurt you, if necessary." Another will say, jokingly, "I don't believe you are a very good dentist." Tell him, jokingly, that he may find a better one, if he chooses.

Beyond question it is not a bad idea to show your indignation and give a patient a good blowing up, under some circumstances. Many a man or woman will be effectually awed and subdued by being indignantly set down upon. The begin-

ner in dentistry might as well make up his mind from the first that he cannot hope to have for a patient every person who consults him. He must learn to discern character, and will do himself the greatest service, in not a few instances, by letting some patients go. If he expects to be a man of recognized character in his community, he must insist, first of all, on a relationship of dignified reserve with most of his patrons. He must remember that his patrons' time is often quite as valuable, if not more valuable, than his own. He must be truly conscientious, or he will soon be found out. And he must not be afraid to charge for every service he thinks he should be paid for, even if his patient objects.

Many dentists drag out a miserable existence, after a few years of practice, simply because they have allowed matters to drift into a shape permitting of their receiving but little money for their services. They are missionaries in the field, and that without even the honor of being recognized as such; imposed upon by the poor and the well-to-do alike; waking up in the end to find others around them, merchants, artisans, clerks, and laboring

men even, far more successful in the long race after this world's goods. These men are pitiable indeed. What such dentists need is pluck to charge adequate fees. Insist on a professional fee! Give patients plainly to understand that they must economize in some other direction than on their dental bills; as a well-known dentist once said, "I find my patients rate me just about as I rate myself."

A dentist should never lose sight of the fact that in devoting his life to dentistry he has denied himself the privilege of many men around him, namely, to make a fortune. Yet nothing requires of the dentist more careful judgment and discrimination than the making of fees.

All the foregoing may be of little significance to many readers of the *Cosmos*. But there are many who need to reform themselves, their methods, their patients. It is never too late to begin. Raise your standards of excellence; raise your fees, openly, avowedly.

Of course this whole matter resolves itself into the question of what is in the man, the dentist—as we all, no doubt, understood in the first place.

RHINOLOGY AND ITS RELATION TO ORTHODONTIA.

By WILLIAM E. CHENERY, M.D.,

PROFESSOR OF LARYNGOLOGY, TUFTS COLLEGE MEDICAL SCHOOL, BOSTON.

(Read before the Section in Orthodontia of the First District Dental Society of New York, December 31, 1908.)

THE relation of obstruction in the upper air-passages and mouth-breathing to irregularities of the teeth and jaws has been frequently discussed, and thereby a closer relationship has been established between the dental practitioner and the rhinologist. Experience has demonstrated the value of co-operation in the two specialties in the advancement of preventive medicine and surgery.

The scientific dentist should no longer be satisfied with a thoughtless extraction or a mouth filled with beautiful mechanical work, neither is it sufficient for the rhinologist to simply clear the nasal and post-nasal passages. Defects in occlusion and asymmetry of the jaws and face should be noted as well as the pathological condition of the nose and nasopharynx; besides, the habits formed by each patient should be studied. Inspec-

tion is especially important in patients between four and twenty, for during this developing or plastic period the best results of corrective surgery of these parts can be obtained. Much can be learned by external inspection and palpation with the mouth closed. Good health, as well as facial beauty, depends on a normal, harmonious, symmetrical development of the mouth, teeth, and nose. The dentist guards one of these important avenues, the rhinologist the other, and both have much in common. As the nose and nasopharynx demand care at the very beginning of life, so the teeth demand attention from their first appearance, and this care should continue regularly to the end.

Obstruction, faulty development, bad habits, and malocclusion can be largely avoided in the beginning. By care and watchfulness much can be done to bring about symmetry. At birth we have very little face in comparison with the rest of the head. This develops afterward, and does not reach its full development until about twenty. A slight deformity of any portion during its growth is likely to throw the other parts of the face out of line. Defects and faults are apt to enlarge with development and become less easily corrigible. Heredity has much to do with the general shape of the face. Its functional usefulness, however, depends largely on development and habits. The nasal fossæ at birth are usually well formed and functionate properly. The method nature has devised for the infant to acquire food enforces *nasal* respiration in the very beginning. With no preceding teeth to influence it the deciduous denture in the healthy child is usually regular in alignment and occlusion. In order to have the maxilla and mandible develop right occlusively, it is important that the arches of the deciduous teeth should be unimpaired.

With the expansion of the jaws for the other and larger teeth of the second denture, irregularities become frequent and noticeable. Guided by the deciduous teeth, the first permanent molars usually erupt correctly. It is generally accepted that these are most important factors in the future development of the jaws;

they should therefore be well cared for, and normal locking of the cusps should be obtained.

Angle has examined several thousand cases of malocclusion with the following results:

	Per cent.
Arches in normal mesio-distal relation	69.2
Lower arch distal to normal in its relation to the upper arch	26.6
Lower arch mesial to normal in its relation to the upper	4.2

The causes of the two latter, contributing approximately 31 per cent. of malocclusion, are interesting.

Nothing in nature is absolutely symmetrical—nutrition, development, and habits govern the final result. The shape of the face depends much on the second dentition. Until this period development has been mainly in the cranium; then the accessory sinuses enlarge, the nasal fossæ increase in height, and the alveolar arches also enlarge. The face develops. Equality of the size of the nasal fossæ and the proper use of these passages is most essential at this period. The future size and shape of the nasal fossæ depend on the size and the descent of the antra of Highmore, the symmetry of the hard palate and the premaxillary wings. Likewise the shape of the mouth depends on the symmetrical development of the halves of the hard palate, and the proper position of the premaxillæ and the maintenance of the normal occlusion of the teeth. Most of the deformities occur in the upper jaw, and when one thinks of the many changes occurring during dentition and the liability to accident, faulty nutrition, and deforming habits, it is wonderful that nature unaided is so harmonious. As aids to the proper eruption of the second denture you all recognize the importance of saving the deciduous teeth; on the other hand, too long retention of these teeth causes trouble. The early loss of a tooth is often an important factor in malocclusion and asymmetrical growth, for each tooth is needed in the construction and maintenance of the normal arch. In malocclusion we also recognize the influence of tardy eruption of permanent

teeth, supernumerary teeth, disuse of teeth and accident, also an abnormal frenum. Habits, the leverage from sucking the thumb, lip, tongue, coat-sleeve, or nipples, if persisted in, are also frequent factors in malocclusion and deformed arches. Mastication is also important in developing the dental and maxillary arches.

Of all the various causes of asymmetry in the development of the face and the dental and maxillary arches, mouth-breathing is the most potent and to my mind most constant. This, unfortunately, is especially common in early years during the formative period, just when its effect in causing asymmetrical development is greatest. The development of the muscles, bones, and functions of the nose, cheek, and tongue are interfered with, as well as the occlusion of the teeth, of course depending on the degree of mouth-breathing, the length of time it is practiced, and the period of development.

Before discussing mouth-breathing from a rhinological standpoint, it is necessary to have certain facts well impressed. The normal entrance of the air to the lungs is through the nose and not the mouth. Departure from this rule for a considerable period of time is most disastrous, especially in the young. This habit, quickly and easily formed, leads soon to pathological changes. The nose is so constructed that it warms to body heat, moistens to saturation, and strains from dust and bacteria all air as it passes through its chambers. It prepares the air for its reception into the delicate bronchioles, where it gives up its oxygen to the blood. The nostrils and nasal fossæ should be of the same size and the air-current passing through them should be approximately equal. The mucous membrane lining the chambers of the nose is most sensitive. Under normal conditions it is bathed with mucus constantly, but never in a large enough amount to require the use of a handkerchief, except a pathological condition be present. The fluid—one pint per day—moistens the inspired air and the mucous membrane of the nasal fossæ, col-

lects the dust and bacteria, and by an arrangement of cilia, whips foreign material back toward the entrance of the nose. The upper part of the nose is the olfactory portion, so nasal breathing is necessary for a proper perception of odors. For good smelling the olfactory passages must be clear, free from abnormal growths or perverted secretions, and the mucous membrane must also be moist.

The internal openings of the Eustachian tubes are situated at the sides of the post-nasal space, just posteriorly to the openings of the nasal chambers and on a line with the inferior turbinates. These tubes tend to open during the act of swallowing, providing they are not covered with secretion or blocked by foreign growths. Therefore, it is important that the post-nasal space should be free from obstruction in any form, whether of secretion or lymphoid tissue. It is also a fact that many eye diseases are caused by pathological pressure-changes in the nose. Besides, the quality and character of the voice depend on the shape and clearness of the nasal chambers, the post-nasal space, and the mouth. It is obvious from these statements that much depends on the nose and mouth being rightly formed, free from obstructions, and rightly used. Whenever there is persistent mouth-breathing something is wrong, and its cause should be sought for and removed, if possible, for the sake of good health, good hearing, good smelling, good eyes, good speech, good teeth, and facial expressions.

Normally, air should be both inhaled and exhaled through the nose, and with equal volume through each nostril. The mouth as an air-passage should be used only occasionally during hurried respiration for temporary need. Habitual mouth-breathing means obstruction in the nose or naso-pharynx, or *habit* if that obstruction has been removed. Anything which tends to narrow the caliber of these passages makes respiration more or less difficult and tends to increase and pervert the secretions and produce mouth-breathing, especially at night. Good ventilation and drainage at all

times are necessary to these parts. Mouth-breathing, if not corrected early, causes the facial muscles to become drawn down. The round face of the baby develops long and narrow; there is a pinched and triangular appearance around the alæ of the nose; from lack of use the alæ collapse; the hard palate and alveolar process, instead of forming the perfect dome-shaped arch, are molded by the lateral pressure of the facial muscles into a high, irregular arch. The upper lip is drawn up so that the pressure resistance to the protrusion of the central incisors is lost, and the push of the tip of the tongue is not opposed. Pressure at the sides of the jaw is constant, always tending to a pushing forward of the teeth, so that often the central incisors crowd each other or overlap and the lateral incisors are often out of occlusion. The upper incisors decidedly overbite the lower ones, and the cutting and biting functions of these teeth are thereby impaired. We must remember that the roof of the mouth is the floor of the nose. Therefore, with a high arch the floor of the nose is raised, and drainage of secretion is interfered with, retention is favored, and a nidus for bacteriological development is produced.

One of the most frequent causes of mouth-breathing in children is the presence of adenoids and enlarged tonsils. In the nose and throat clinic of the Boston Dispensary during the years 1906 and 1907 there were treated 2663 children of fifteen years of age or under. Of these the book diagnosis shows the prominent pathological conditions to be adenoids and enlarged tonsils, one or both—64.8 per cent. had this diagnosis. The next diseases in order of frequency were acute tonsillitis 6 per cent., chronic rhinitis 5 per cent., deviation of the septum $4\frac{1}{2}$ per cent., acute rhinitis $3\frac{1}{4}$ per cent. These conditions represent about 85 per cent. of the cases examined.

Last year the department of school hygiene in the city of Boston most successfully inaugurated a system of school nursing. In the recently published report of the superintendent of schools the

nurses' work is compiled, and I find that during the school year of 1907-08 these nurses had their attention called to and investigated 11,743 cases of nose and throat diseases, and of these 7056 or over 65 per cent. were adenoids and enlarged tonsils. Next in frequency was acute tonsillitis with 1373 cases, or 11 per cent. About three-fourths of the complaints were from adenoids or some tonsil condition. These figures are significant, and should be borne in mind by the dentist as showing the prominent factor in causing mouth-breathing in children, which in turn favors malocclusion of the teeth.

Holt says: "Speaking of adenoids, it is a very common condition, and one very much neglected by the general practitioner. It is the source of more discomfort and the origin of more minor ailments than almost any other pathological condition."

Adenoids are hypertrophied lymph glands situated on the upper and posterior wall of the naso-pharynx. The glands are sometimes called the third or pharyngeal tonsil. They are less fibrous in their make-up than the faucial tonsils. The normal lymphoid tissue, by irritation, inflammation, and infection, especially during early childhood, becomes hypertrophied and so forms the adenoids. Scarlet fever, measles, and influenza are especially exciting causes. Children are very susceptible to lymphoid infection, because this tissue is soft and friable, which is not so with adults. Adenoids occur most frequently between the ages of four and fifteen, but they may be present at any period of life. While the tendency of this growth is to atrophy at puberty, it may not do so, and operation should never be delayed because of the hope that the adenoids will disappear.

The symptoms of adenoids depend (1) on obstruction of the air-current through the naso-pharynx, (2) on interference with the movements of the soft palate, and (3) on the increase in secretion from the adenoids. The smaller the naso-pharynx the greater the obstruction from adenoids. Mouth-breathing, especially

at night, and heavy, snoring respiration are the rule. The child is suffocated, choked up, croupy, and its sleep is broken and disturbed; it frequently talks and moans in its sleep, has night terrors, sometimes enuresis, and is apt to have a cough at night. It often has difficulty in nursing and sometimes the chest is deformed, producing what is called chicken-breast. Prolonged mouth-breathing gives the characteristic picture of the lower jaw dropped, the lips parted constantly, the upper lip foreshortened and thickened, leaving the upper incisors uncovered. The muscles of the face are pulled down so as to give an elongated and pinched appearance, with a vacant, listless expression. The nose is narrow and pinched. The upper jaw, by constant pressure of the cheek muscles and lack of lip and tongue resistance, is elongated in the antero-posterior diameter. The alveolar process is pulled down, and the arch becomes high and V-shaped, and the teeth become irregular. This condition does not occur with the deciduous dentition but with the second denture, when by the molding processes the central incisors are made to crowd each other or overlap. The breath is fetid, the patient cannot blow his nose well, and the voice is affected, becoming nasal in character. The patient has frequent colds, earache, and dulness of hearing is the rule. The teachers say the pupil is stupid or inattentive, when the whole cause is the presence of adenoids.

The most prevalent and harmful period for adenoids is between four and eight. Thorough removal at this time is essential, for then good health and the normal dome-shaped arch will be formed and proper occlusion will be secured, providing bad habits have not been formed and persisted in. Head-bands and plaster to keep the mouth closed after operation are often desirable, and regular exercises in nasal inhalation and exhalation are always advisable.

Ballenger says it is almost a universal rule that when tonsils are hypertrophied adenoids are also present. On the other hand, in patients with adenoids enlarged

we may have only 30 per cent. with enlarged tonsils.

There has been much discussion about the faucial tonsils and their functions. Normally they should be about the size of almonds, but when enlarged they are frequently of the size of horse-chestnuts. They are often the entering point of infection. Irregular and decayed teeth produce a filthy mouth, and the warmth and lodging-places favor bacterial growth. The tonsils are mesh-like, filled with little crypts—from eight to twenty—and they have therefore sometimes been called human sponges. Through these little crypts the tonsils become infected, and are therefore a source of danger to the individual. With tonsillar enlargement mouth-breathing is favored, and sore throat common. Carious teeth may be the starting-point of faucial infection. Whatever the functions of the tonsils may finally be proved to be, there is no doubt that enlarged tonsils easily become diseased and are a menace to health, and because of their position have a causative effect in malocclusion; therefore they should be removed. It is interesting to note that from 4 to 10 per cent. of the tonsils removed show local tubercular lesions.

Normal nasal breathing is possible only with properly developed nasal chambers. Deviation of the septum is a frequent cause of mouth-breathing. Normally the septum should be straight, but we frequently, on one side or the other, find spurs, ridges, or deviations. Commonly we say the deformity is due to trauma or faulty development. The septum in front is formed by the quadrangular cartilage, which articulates with the vertical plate of the ethmoid and the upper edge of the vomer. The tip of the vomer runs forward and fits into a groove formed by the premaxillary wings, which spring upward and outward from the posterior part of the premaxillæ. Just above the latter is the lower portion of the quadrangular cartilage, and the nasal spine projects forward from the upper portion of the premaxillæ; these do not unite until the first year. In the premaxillæ are situated

the incisor teeth. At fifteen the premaxillary wings unite with the tip of the vomer, and are sometimes called the subvomer bones. At this place in the septum spurs and deviations are very apt to be found, because of its structural weakness and as a result of traumatism, also because of the inequality of growth of cartilage and bone. Obstruction at the very entrance of the nasal chambers is sure to cause mouth-breathing.

Dr. Mosher has found that wherever there was a moderate and equal delay in the eruption of the central incisors the premaxillary wings were symmetrically enlarged at the floor of the nose on both sides, and there was no deviation of the septum. Where, however, there was marked inequality and delay in the eruption of one central incisor as compared with the other, then on the side of the backward tooth the premaxillary wing was much enlarged or displaced, and the quadrangular cartilage was tipped out of its bed along the vomer-ethmoid suture, and so deviation of the septum resulted. He also finds the root of the lateral incisors frequently mounting upward to the floor of the nose, but even if much displaced they do not affect the form of the septum.

Injury to the nasal spine or quadrangular cartilage may cause spurs and deviations by dislocating the cartilage or by splitting the wings of the premaxillæ or a part of the vomer. Enlargement of the nasal spine or the premaxillary wings may cause spurs and deviations of the septum. Delayed eruption of the incisor teeth causes enlargement of the premaxillary wings, and thereby deviation of the septum. The anterior openings of the nose may be of unequal height and size, owing to the central incisor teeth, also the shape of the posterior or choanal openings of the nasal fossæ may be affected by the upper third molars. Unequal descent of the antra results in unequal development of the halves of the palate, one side being higher than the other, whereby deviation of the septum is favored.

The mucous membrane of the nasal passages is, as I have said, very sensitive;

besides, the turbinates have erectile power. A simple so-called cold in the head produces hyperemia and hypertrophy of the mucous membrane of the nose; the turbinates swell and there is more or less increased secretion; nasal respiration is interfered with, especially at night. If these attacks are occasional and last for a short period only, no special harm is done. But there is a tendency to recurrent attacks of rhinitis, so that we have a chronic hypertrophy of the turbinates and mucous membrane resulting. Then proper nasal respiration is impaired all the time, by day as well as by night. Ventilation and drainage of the nose, which is most essential, is prevented. Later the sinuses may become involved, especially the ethmoidal cells, and with this we often have polypoid degeneration. Acute or chronic rhinitis in the earlier years, when the nasal chambers are small, favor and soon establish the mouth-breathing habit.

It must be evident after this brief study of the principal pathological conditions of the nose and throat of children that a close relationship exists between rhinology and orthodontia. It is during the period of growth and development of the face, which is mainly before the age of fifteen, that malocclusions form. It is essential that the normal air-pressure and the normal balance of forces should be maintained during this time. We should watch closely for obstructions and deforming habits, and thus prevent many malocclusions. It is never too early to correct; it may be too late, for when the mouth-breathing habit is firmly established, malocclusion fixed, and the plastic period is past, satisfactory results may never be obtained, or, if so, with a much greater expenditure of energy, time, and money.

The physician should be impressed with the importance of the early care of the nose, naso-pharynx, and teeth, and every dentist should be a practical orthodontist, always bearing in mind causal conditions in the nose and throat. Not infrequently I have seen corrective appliances on teeth where both obstructive tonsils and adenoids were present. Bet-

ter and easier results would have been obtained if these obstructions had first been removed. Recently I saw a most elaborate wire appliance in a young adult mouth where the left nasal passage was completely occluded by a septal deviation. No thought of nasal examination or previous treatment had been considered before instituting the orthodontia procedure. By the careful watching of young

children, both by the family physician and the dentist, the irregularities of the teeth which result from obstruction either of the nose, the naso-pharynx, or the fauces, and the mouth-breathing habit can be avoided. There is a certain interdependence between the two specialties and I bespeak an even closer relationship between the rhinologist and the orthodontist.

CORRESPONDENCE.

METHODS ADOPTED FOR THE CARE OF THE TEETH OF PUBLIC-SCHOOL PUPILS IN MEXICO.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—Under the title of "Free Dental Service in the Public Schools of Mexico," an article appeared in the DENTAL COSMOS for the month of June 1908, page 604, which was signed by Mr. Johan de la Parra, and in which, speaking of the advantages of establishing a service to supervise the preservation of the teeth of the children who attend the elementary schools of the city, he enters into various considerations which would have to be taken into account had not the necessities which he desires to have attended to been for some years past foreseen, as well as the methods to be employed in attending to them.

There can be no doubt whatever that the school service in the City of Mexico, with its many details, is unknown to this writer, and only on this ground can we excuse his error when he states that nothing has been done to preserve in the best possible order the teeth of the children who attend those schools. As a matter of fact, the care of the teeth, as is well known, is a question of personal hygiene, and the public authorities have borne this fact in mind, and included in their programs of study in all the schools, viz, elementary, superior, etc., the study of this subject; and moreover, consider-

ing that this might not be sufficient, it created some time ago a corps of medical inspectors, who, in the daily discharge of their duties, give all the suggestions necessary for protecting the health of the pupils. The government also maintains an institution which is dedicated to the teaching of the courses required for the graduation of a surgeon dentist, while in the clinics of that school all sufferers from diseases of the mouth are treated free of charge. Among these, pupils from the schools receive attention by preference, apart from the expert examination which under the law is made by the professors and pupils of the last year in the courses of dental surgery, during their periodical visits to the primary schools.

The appropriation for the corps of medical inspectors and dental school clinic for the present year amounts to \$36,978, and this detail alone is an eloquent proof that, with a perfect understanding of their duties, the directors of public education have foreseen the necessities of the case and provided the resources to secure due attention to the health of the pupils in general. Rules have been carefully drawn up, and have been for a long time observed, which provide for instruction in private hygiene

as part of the curriculum of the schools, and among these rules are those which relate to the preservation of the teeth. The sanitary inspection of the pupils in these schools is under the charge of a medical staff, while in well-equipped clinics, placed under the charge of competent dental surgeons, the children who suffer from any disease of the mouth are attended free of charge. These official services are not found in that form in many countries, and only ignorance of these facts could have inspired the article above referred to.

The foregoing explanation is intended to establish the truth in a matter that is little known and still less properly considered, as in view of the importance which professional men give to everything published in the *DENTAL COSMOS*, silence on this point would be equivalent to an acceptance of erroneous statements, which, although made in perfectly good faith, are written with but slight knowledge or reflection.

FRANCISCO DE P. BERNÁLDEZ,
Director National Dental Clinic.

(To be continued.)

PROCEEDINGS OF SOCIETIES

FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

Monthly Meeting, March 1908.

A REGULAR meeting of the First District Dental Society of the State of New York was held on Tuesday evening, March 10, 1908, at the Academy of Medicine, No. 17 West 43d st., New York city. The president, Dr. Taylor, occupied the chair, and called the meeting to order. The secretary read the minutes of the last meeting, which were approved. The president requested all new members to sign the roll.

After some routine business, there were shown under the head of

INCIDENTS OF OFFICE PRACTICE

some regulating appliances.

Dr. J. LOWE YOUNG. I have here a few gold arches that are made of a gold which can be soldered with 22-karat gold solder, and still maintain their spring. I do not mean by that that they are quite as springy as if they had never been heated, because I do not think it possi-

ble to take a gold alloy and anneal it and have it as springy as when it comes from the blowpipe. But these arches have many advantages over, and are more springy than the best German silver arch I have ever been able to obtain.

I will pass around these illustrations of the appliances. On each arch you will notice a split tube which you can pull off and put on, just tied with a piece of silk so that it will not be lost. This tube springs over a tapered nut in such a way that the nut is clamped, and will not loosen up in the mouth. The arch with the lugs is soldered with 22-karat gold solder.

This box contains two arches, each 16 gage; the one with the hooks has not been handled from the time the hooks were soldered on this morning. If you want more spring after soldering the attachments to it, it is easily obtained by polishing the arch with a buff. That seems to bring back the spring.

On this dentiform, on the right side, the tube is soldered to the band in such a way that with properly shaped pliers it can be bent without being removed from the mouth.

This tube was soldered on so that the arch would telescope into it; then it was removed and bent in that way [illustrating], and the arch is ligated there to show how much it can be bent without interfering with the band. This attachment is very useful in treating a certain kind of cases where there is a tendency of the arch to drop down over the incisal edge as the treatment progresses.

It is always advisable before bending these arches to anneal them very thoroughly, not only where you wish to bend them, but in their entire length. If you only anneal the arch where you want to bend it, you are liable to break it somewhere else, but if you heat the entire arch red hot and then polish it, you will get all the spring desired.

Dr. PERRY. I wish to call attention to one matter which is worthy of our attention. Our stenographer has the complete records of the memorial meeting held by this society, the Odontological Society and the Second District Society combined. At a memorial meeting given on the occasion of Dr. McKellops' death, we took a great deal of pains in issuing a small pamphlet which gave a record of the remarks made on that occasion. I think we should do no less with our own intimate friends in this city, and I move that a pamphlet containing the pictures of Dr. Littig, Dr. John I. Hart, Dr. Goldsmith, Dr. Brewster, and Dr. Eugene Palmer be issued by this society, the expense to be shared by the New York Odontological Society and the Second District Society, so that we may have the opportunity of having in our profession the pictures of those dear friends, as well as the remarks made on that evening. (Motion carried.)

Dr. WALKER. I think a committee should be appointed to look after this publication, with Dr. Perry as chairman.

While the members are busy with their ballots, I think it would not be out of

place for the Executive Committee to report the progress of the Farrar dinner, which is to take place on the 21st. That is not only a dinner to Dr. Farrar, but a reunion of the members of the First District Society, which numbers almost four hundred. I am one of the oldest members, but I do not believe that I know one hundred personally. Here is an opportunity for the members to meet each other, and at the same time pay their respects to one of the oldest members of the society.

A paper was then read by Dr. ARTHUR ZENTLER, New York, N. Y., entitled

A PLEA FOR THE PROPER CARE OF THE MOUTH OF THE POOR.

The task that I undertake is to point out the imperative necessity of putting in practice the subject of my plea, and of finding a way of doing it.

The probable result and the benefit that may be derived therefrom warrants, I think, not only the slight effort on my part, but any effort toward immediate accomplishment of the purpose, it being true that "Not what one professes, but what one practices, makes him righteous."

There are a number of free clinics in New York city, especially in the crowded districts where their want is naturally most urgently felt; some of them are attached to hospitals, some are independent sanitary institutions, having various departments for the various diseases that may afflict the body as a whole, or any of its special organs. Many of these clinics have, along with the other departments, provided also for the very important organs of the vestibule of the digestive apparatus—they have equipped a dental department. But whether these dental departments have reached the ideal point of doing the utmost of what they could do under more favorable circumstances, and whether these circumstances could not be favorably changed through hearty and earnest co-operation of all members of the dental profession who have the elevation of the profession at heart, and finally, whether through

changing these circumstances, the ideal point of activity of a dental clinic could not be reached, are questions which I hope the discussion which this paper intends to invite will solve.

If it is considered necessary in the treatment of any other organs of the body of the poor that all possible means known to the healing professions should be used for their possible cure and preservation, the teeth are entitled to such consideration in an equally large measure. If a sore finger, or eye, ear, etc., is not amputated because it is sore, why should a tooth which comes under the observation of the doctor in charge of the dental clinic be extracted without all the means for its preservation having been previously exhausted, simply because the poor patient says that his tooth aches and he cannot afford to go to the dentist to have it treated, cured, and filled.

If for such reasons all or almost all of the teeth of the poor will be removed by this so-called charity, the necessary result is that by degrees these poor will have only a very limited number of teeth, probably bad ones, or perhaps none at all; and, if they are not able to have these teeth treated gradually, one by one, and filled, they will still less be able to bear the greater expense of having good prosthetic work done, and very often will have to go without teeth at all. Who, if not the poor class, whose hard labor is of such a nature as to require a larger quantity of nourishment, and whose small earnings oblige them to eat mostly coarse food, need to a greater extent these organs which are of foremost importance in the preparation of nourishment? Of what value is this nourishment, even if it be of the best nutritive quality, if it be taken in without having first passed through this one very important process of digestion, *i.e.* thorough mastication, or if before it reaches the digestive tube it has passed through an area of infection and carries with it, mixed with the saliva, a quantity of pus and putrefied débris generated from abscessed or decayed teeth?

This is as a rule the condition of the mouth of the poor who cannot afford to

receive any other treatment but that offered in the clinics. While it would be unjust to say that all dental clinics of this city mostly perform extractions, yet most of them do very little else, because, I dare say, the conditions are unfavorable. It is these unfavorable conditions which the dental profession must earnestly strive to change in order to prevent results such as cases of young men who have undergone this so-called treatment in the dental clinic and have lost a number of teeth that might have been saved, and who, when they wish to apply for positions—for instance, in the police or fire department, in the navy or army—although they can comply with all other requirements, are rejected on account of lack of teeth. Equally as great is the number of young women who are unable to reach better positions in life on account of the same practice of most dental clinics, namely, “comfort by extirpation.” It ought to be clear to everybody that the activity of a dental clinic for the poor ought to be exactly the opposite, namely, “comfort by preservation,” as much as it is practicable and in as large a proportion as it is done in the dentist’s private office.

Is it only the motive of charity, the desire of comforting the suffering, that ought to prompt us to strive toward the betterment of the condition of the mouths of the poor? Is it not elementary knowledge that a filthy mouth is a most speedy vehicle of infection, that if our poor laboring classes would have their teeth cared for as well as the people that can afford to pay for it, the chances of spreading diseases among the crowds in factories, shops, and through their medium among the homes in the crowded tenement districts, would be greatly diminished? Would it not be profitable from a political economical standpoint, both for the individual and for the state, to have this poor laboring class in a condition where they can digest their food well, where they can inhale the little oxygen that is at their disposal in as pure a state as possible? And can they do it with a filthy mouth, full of bad teeth or with a lot of them missing?

They cannot, and as long as the health authorities will not realize that a dental clinic is as indispensable in every hospital or other sanitary institution as the knife is to the surgeon, so long we cannot expect to improve the hygienic condition of the poor, because diseases of the nose and throat cannot be successfully treated while the mouth is full of bad teeth; diseases of the ear often originate from a bad tooth; diseases of the eye have been noticed to appear incurable until due care was given to some offensive tooth; some diseases of the alimentary tract cannot be cured as long as the mouth is not in a healthy condition; certain forms of rheumatism have been improved by a remedying of certain pathological conditions of the mouth; general surgery has quite often been on an erroneous path on account of bad teeth, the condition of which was unknown to the surgeon. Moreover, can tuberculosis be checked in a community in which the mouths of the masses are unhealthy?

Therefore, the teeth of the poor must be taken care of, not only in order to comfort them, but in the interest of the community. The worthy crusade made for the care of the teeth of the children in public schools cannot be helped any better than by illustrating to their fathers and mothers, brothers and sisters, through personal experience, how much better it is to have a healthy, clean mouth than one full of tartar, caries, abscesses, etc. They will then more readily co-operate with these worthy pioneers of the cause and will at home attend to what the best dentist cannot do for them, namely, daily prophylaxis.

It is simply astonishing why government or privately endowed hospitals, in which all other departments are equipped in the most complete way, have no proper poor man's dental clinic, although the equipment and the materials for treatment, cure, and preservation of the teeth are of such trifling cost. The report of the dental clinic in Strassburg, Germany, shows, for the year 1906, an expenditure of 8550 marks, of which 5400 marks were expended alone for salaries, 300 marks for instruments, and only 500

marks for filling materials, for inserting 8340 fillings and for taking care of the mouths of in all 18,607 children, which means that the cost was about one-half mark per child—one mark being equal to about twenty-five cents.

Why this country, which is the recognized leader in dentistry, should lack in the proper care of the mouths of the poor is incomprehensible.

In France a great deal is done toward taking care of the mouths of the poor. Every hospital in Paris, with very few exceptions, has a dental department giving free treatment to the poor. In addition to that, every district of Paris has a dental department in the city clinics which are attached to the various branches of the main city hall of Paris. The same organization for the care of the mouths of the poor exists in most of the large provincial cities of France.

It is true that as yet not only conservative treatment is given in all these clinics, but it is also true that even orthodontia is practiced in some of the hospitals. One clinic is a part of the École Dentaire de Paris, but inasmuch as it is supported by the city, being a dispensary of public assistance, it gives entirely free operative as well as prosthetic and orthodontic treatment to the mouths of the poor. All cases for prosthodontia coming to the hospitals, where only operative work is done, are, with a card signed by the doctor in charge at the hospital, sent to this school-infirmiry, where treatment is administered free of charge.

In Germany the dental clinic for the poor is spreading all over the country. They have there thirty-three clinics exclusively for school children. Each German university having a medical department has a dental clinic attached to it, where free treatment is given to the poor. In Berlin there are several private dental clinics supported by private funds. The great Virchow Krankenhaus (Sanitarium) has an efficient dental clinic; the Landesversicherungs Anstalt (State Insurance Institution) in Berlin spends 100,000 marks per annum for artificial teeth; the dispensaries of the military posts in Hamburg, Leipzig, Dresden,

Munich, and Nuremburg have dental clinics for the preservation of the teeth of the army men, and if one considers that it is obligatory for every able-bodied German to serve in the army, it is easily seen that almost every German between the ages of twenty-one and twenty-four, if he has not had it done before, will have, on entering the military service, his mouth put in a sanitary condition, and will be educated up to the necessity of always keeping it in good condition; for, when the habit of keeping the mouth clean is once established, it will be continued.

In Switzerland the system introduced and observed throughout Germany is followed.

In England, in 1904, the government began to take a hand in the care of the mouths of the people, and in a report of the Inter-Departmental Committee on Physical Deterioration presented to Parliament, a warning is sounded that "The teeth of the people have become much worse of late years, and in many parts of the country may be described as very bad." Advice is given that in the elements of hygiene taught in schools, the care of the teeth should receive special attention; it is also suggested that systematic examination and treatment of the teeth of children by dentists should be carried out wherever possible, in order to insure a good set of teeth in after years.

In various English hospitals the dental departments give free treatment to the poor. The Royal Dental Hospital of London publishes for distribution a pamphlet on "Instruction on the Care of the Teeth," which is headed "A Sound Set of Teeth is Essential to Health," and explains in detail and in a popular form all that people ought to know about their teeth in order to intelligently take care of them.

In Italy in several cities there are free dental clinics for the poor, some attached to hospitals, some forming part of general polyclinics supported by private charitable associations. Florence has three "ambulatorii medico-chirurgici" (medical surgical polyclinics), having each a dental department; Naples has two

free dental clinics, each attached to a hospital; Rome has one free dental clinic attached to the university school. A number of other cities, like Brescia, Turin, Milan, and others, have each one free dental clinic. Only "relief work," as my kind informer, expressing his regrets, calls it, is done in most of these Italian dental clinics—they insert oxyphosphate fillings and extract teeth.

In Austria there are dental clinics for the poor in Vienna and in five other large cities.

In Hungary there is, in Budapest, one of the finest and best equipped dental clinics, which has now existed for seventeen years, and for which is about to be completed a special building, the plans and organization of which have been shown at the Congress of Stomatology held in Paris last summer.

In contrast to what is done abroad and to the strong tendency of the spreading more and more of dental clinics in the European countries, how small seems a similar effort toward this purpose in this country in New York!

One clinic, which, unfortunately, is limited to children, is doing most effective work, and its organization is very complete. The staff, with the organizer, Dr. Herbert L. Wheeler, as chief, has examined in less than a year, in the rooms set aside for this purpose at the industrial school of the Children's Aid Society, 555 children's mouths, for whom 284 fillings have been inserted, 200 teeth having been previously treated. The number of cavities found was 2362 and 77 permanent and 370 deciduous teeth had to be extracted; only 24 children's teeth were cleaned, the work for immediate relief having interfered with the accomplishing of this most important operation in a larger proportion. The chart system adopted by Dr. Wheeler is very accurate and shows both the kind of operation and the operator who performed each individual operation.

At the New York Nose, Throat, and Lung Hospital, the dental clinic, of which Dr. W. D. Tracy is chief, is taking care of adults as well as of children, and, from the figures shown, the activity

of the clinic during the year 1906-07 tended strongly toward conservative dentistry: 464 new patients visited the clinic during that period, and 1400 return visits were made; 717 fillings were inserted, previous to which 499 treatments were given; 16 abscessed teeth were cured, and 460 teeth had to be extracted; only 68 examinations were made and only 129 patients' teeth were cleaned, the work for immediate relief being paramount, presumably for the same reason as mentioned before.

The dental department at the St. Bartholomew's clinics is well equipped, but there were no statistical records available to show the character of the treatment given to the visitors; their number during the year 1907 exceeded 3000.

The few other dental clinics in New York only extract teeth.

There are, of course, the two dental clinics attached to the two dental schools, but these fulfil the purpose of educating dental students and do not enter in the class of clinics for the poor.

Observing, recording, comparing, and reflecting, we are led to the following conclusions:

Observing the above-stated records, we see that with the best intention and with the greatest desire of the chiefs and the staffs of the existing few dental clinics in New York, the proportion of preventive and conservative as over against extirpative dentistry is not such as the ideal dental clinic for the poor would have it.

Comparing, we see that the statistics of the city dental clinic in Strassburg, for the year 1906, show that during one month, the month of June, there were inserted 427 fillings in permanent and 420 in deciduous teeth, altogether 1091 fillings, while during an entire year in the dental clinics of the city of New York, which has about fifty times the population of Strassburg, only 1001 fillings are recorded as having been inserted.

Without need of too much reflecting, the reason why so much could be done there and so little was done here, is easily detected: The number of dental clinics in New York, and for that matter

all over the United States, is immensely out of proportion with the number of people that need their services.

Dr. Haven Emerson, a physician—and I emphasize this because a physician is likely to find fewer cavities in examining teeth than a dentist would—reported to the New York Association for Improving the Condition of the poor that in an examination made for the purpose of the general care of the "stay parties" of the Sea Breeze for the summer of 1907, he found that of 634 adults, mothers and daughters over 15 years, only 19 had no defective teeth. The other 615 or 97 per cent. had 4022 decayed, an average of 6.5; 1655 teeth were missing, an average of 2.7; there were 1444 artificial, an average of 2.3, in addition to those found missing, showing that these 634 adults lacked the use of 28.8 per cent. of their teeth, and in addition had 7.2 per cent. replaced by artificial ones.

The American Statistical Association, in its quarterly publication for June 1907, states that taking for a basis 1400 children whose physical defects were examined, and granting that they are representative of school children in New York city and in the United States, the number of children in New York city having bad teeth would be nearly 300,000, and in the United States, nearly 9,000,000.

All this leads to only one conclusion: That the free dental clinic where the teeth of the poor are examined, cleaned, treated, and filled, and where just as much instruction for the prophylactic care of their mouth is given to them as to the patients of private offices, is of imperative necessity; that first the dental profession and then the health and hospital authorities must recognize this fact, and must all co-operate toward the establishing of free dental clinics in all the hospitals and in all the institutions that minister to the sick poor.

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Discussion.

Dr. S. G. PERRY. I was asked to open the discussion, and I consented because this subject has been near to my heart for many years. Fully twenty-five years ago, I thought much about it, and talked with a number of our leading men, many of whom are now dead, about trying to do something for the poor. I found very little encouragement, but hoped that sometime something would be done for the poor of New York city, and now after all those long years, it seems as though something might be done.

Let me compliment our essayist on his excellent paper, so full of earnestness, so crowded with statistics which must have cost him much effort, and which should be very valuable to us in paving the way for what we hope to do in the future.

I suppose it is fitting to make a plea for this cause. The building in which we have met is a monument to the medical profession, and the pictures we see on these walls represent men who have been eminent in the practice of medicine, and helpful to their kind. No class of men have in the past done so much for the human race as those enrolled in the practice of medicine and surgery, and if we, who claim to be a branch of medicine, are content to be backward in our interest in the affairs of the poor in the communities in which we live it can be no credit to us. One of the strongest reasons why we should take a keener interest in the teeth of the poor is that we should emulate our brethren of medicine, who for centuries past have been renowned for the good which they have done to the poor. We must be up and doing, if we want to keep pace with our parent profession. We must show ourselves worthy of being a part of the medical profession.

Then, too, we like to stand well with the lay community. We shall do so in proportion as we fit ourselves for performing the work we have to do; and if we can show that we are unselfish enough to do something for the poor we shall be entitled to the confidence of the public.

There is also another consideration. Compassion is one of the most beautiful qualities in the human heart. There is nothing that appeals to us so much as the spirit of compassion, and in doing something for the poor we not only benefit them but also ourselves, because we cannot be concerned with those who need our help, and who are suffering, without being ourselves helped because of that sweet sympathy. There is a strong plea from any standpoint you choose to take in reference to the matter of the care of the teeth of the poor.

The question naturally arises: What can we do? We look over the field in Europe, and find the European cities ahead of us. Strassburg for about five years past has had an organized clinic or dispensary, which has been conducted under the supervision of the state.

In Germany, as you perhaps know,

insurance is compulsory. Men and women there are compelled to insure their lives, for a few cents a week or a month, and as a result a fund has accumulated by which the very old men or women have means of support, it being hoped that eventually there will be no very needy poor, an idea which was conceived first by Bismarck and the older King William, and which has been gradually carried out until the amount so accumulated is almost fabulous. The benefit accruing therefrom is almost beyond computation, the government seeming to take a paternal attitude toward its children. This is a curious condition—a military government doing those things to strengthen the empire by having more efficient soldiers—and one which we, in this free country, have never been able to approach. How small is our credit in that respect in this country, of which we boast so much in the matter of dental achievements! There is no question, although it is almost disloyal to say it, that our republican institutions give too much liberty, and expect too little in return for the privileges granted. In Germany and France, and perhaps other countries, the paternal attitude is wiser, because the government becomes to a certain extent responsible for the happiness of its subjects.

How can we meet this new question? It is sure to take hold of us and to touch our sympathies and to appeal to our own common sense. It is useless for us to *talk* of being members of a liberal profession; we must *do* something to make good. It is useless for us to work in our comfortable rooms, and work for the rich only, while we neglect the poor. I will not arraign the dental profession, because it has been busy perfecting itself. We have had to do with only the best people in the community, and we did not realize the poverty that exists in this city, for instance. Talk with Mr. Robert Hunter, and learn from him some of the conditions that exist in a great city like New York, some of the heartrending facts about the needs of the poor. We should have compassion for them, and I wish to make an earnest plea from that senti-

mental standpoint of compassion, not so much with the aim of producing a stronger race, as the French and Germans do, in order to cope with possible adversaries, but simply with the aim of being more compassionate with those who need us.

How shall we give that help? I would not presume to fully answer this question. I do not know which the practical and wise way would be, but the question will have to be met, not sentimentally, but from a business standpoint, and it will be a matter of dollars and cents, and of time and professional services given by the younger men coming into the profession. I am in sympathy with establishing clinics in connection with the hospitals, securing in that way the aid of the medical profession and by that very action drawing the bonds closer between our specialty and the profession of medicine.

There are so many who need help, and all the clinics established in connection with all the hospitals would only be a drop in the bucket. There should be some other way, lying beyond the suspicion of selfishness and self-seeking. It has seemed to me that the efforts of those young men who have so nobly and so wisely made a move in this direction should be supplemented in a larger measure by enlisting the community at large. Having known for many years Mr. Fulton Cutting, who is associated with that work, I asked him whether, if an interest could be created in the dental profession of New York city for the benefit of the poor, the Association for the Improvement of the Poor would be sympathetic, and would consider combined action. He answered in the most emphatic tone, "Certainly, that is what we are here for. We should only be too glad to help you." He asked what he could do, and I said that I did not know, that I had no plans or suggestions, but I hoped that we as a profession without regard to any special society would meet on a common ground, free from all thought of society or personal interest. He gave me the address of the business manager of the Association for the Improvement of the Poor,

Mr. Bruère. He said that he was going to leave shortly for California and so would not be able to give it his personal attention, but that Mr. Bruère would help us.

Mr. Bruère came to see me on Sunday evening, and I spent an interesting hour with him. He told me of the work done with regard to the prevention of tuberculosis, and the examination of milk, and spoke about the Sea Breeze Hospital, where so much good is done. He said to me, "If you find a desire or sympathetic attitude toward this matter, we shall help you in any way, and any money we can supply will be given."

I also had a long talk with Mr. Hunter, who has written a book on poverty. He said that he had been helpful in organizing in Chicago a clinic somewhat on these lines, but that he had heard it was not continuing to do as good work as was hoped when he left. He expressed the hope that the several charitable organizations would be ready to help us to carry on this work.

I cannot help but think that we, as dentists, can ourselves not fully cope with this question. If our younger men can give their time and services, and have the burden distributed upon so many shoulders that it will not be onerous to any one person, we can do a great deal for the benefit of the poor, but we are deficient in means of organization. The Association for the Improvement of the Poor of New York is an organized institution, managed on business principles, and if you would look at its report for this last year, you would see what has been done in the different departments of its activities. There is sentiment at the basis of this organization, but sentiment is thrown to the winds when it comes to the matter of funds. If we have the help of an organization like this and of several other organizations which are in existence in this city, whose co-operation could perhaps be obtained, in my opinion far more can be accomplished than we could accomplish in our own individual way. I feel that a society like the First District Society, which is organized under the state law, and democratic in its purposes and objects, would

be efficient, and if we could devise a plan by which concerted action in connection with the clinics could be taken, something could be surely accomplished.

Dr. Emerson, in a short report, gives the following summary of the work done. [Dr. Perry then read the report.]

In another part of the report on the physical welfare of school children, Dr. Emerson makes the following characteristic and important statement. [Dr. Perry then read the same.]

It is evident that this association is ready to be helpful to us in any way we wish, if we think it best to ask their aid.

I have taken more time than I should, but I feel very earnestly on this subject, and am convinced that something more should be done than has been in the past. It is one of the marks of civilization that the poor should be cared for, and year by year, as we grow older, the idea becomes clearer that the poor cannot take care of themselves; they must be taken care of, and the fundamental idea propagated by Bismarck and Emperor William, that there must be a paternal interest, is a correct one. If the poor cannot take care of themselves they must be taken care of, for the betterment of the community as well as for their own sake.

We can do no better than to stand before this wide community ready and sympathetic in some concerted action for the benefit of the poor. I hope that we can combine in some way by which it shall be self-evident that we are unselfish, from the first to the last, and just in proportion as we are unselfish and as we strive to benefit those who suffer, we shall ourselves be benefited.

Dr. W. D. TRACY. It seems to me that this is indeed a fitting paper for our time, and it is proper that such an important paper should appear before such an influential and important society. The phases of the subject are so numerous and varied that it would be impossible for anyone to touch on all of them in the course of an evening; but even after Dr. Perry's eloquent remarks, there are some things I might say which would be of interest.

The essayist speaks of the ideal to

which we should look in these matters, and asks the question if we have reached our ideal in the dental clinics. I trust not; if we have reached it, I am afraid the ideal is not very high.

The importance of the teeth to the individual and to the community is more strongly appreciated today than it has ever been before in civilization. The statistics given in the paper show that even many years ago the continental countries appreciated the importance of the teeth and provided for their care. It is not strange that in a republican form of government we should be behind the continental countries, because it is true that the child does not do for itself as well as the parent will do for it, and as we have our own liberty and go our own way, we have not done as well, perhaps, as those who have been advised by a paternal government. Possibly, as we grow older and wiser, we shall understand the necessity of looking more carefully after all the organs of the body. Since the importance of the teeth has been shown to us, we are, as a people, taking better care of them and devoting more attention to the prophylaxis of the mouth.

The essayist says the hospitals and institutions abroad almost all have dental clinics. It is a promising sign of the times that many of the institutions here are establishing dental clinics, and there are some others independent of institutions. There is a great deal of time, money, and energy spent in the cure of tuberculosis, which is, of course, as it should be. That must be taken as a special thing; but if we could have more time and money for the care of the mouth and teeth, the work of the tubercular section could, in my opinion, be facilitated. If prophylactic treatment could be given to those people, the work of the Tuberculosis commission would be rendered much easier.

Speaking of prophylaxis among the poor, it is one of the most important points of our work to give such instruction as we think they can understand and appreciate, and it is surprising and gratifying to see how those people, benighted as they are, will respond. We

ask some patients how often they brush their teeth, and they say they never do. We know, of course, that they do not, but that is a delicate way of going about the subject.

At the clinic in which I am doing a little work, and in which I am very much interested, we sell at a small price a tooth-brush and powder, and it is surprising to see how much benefit the patients derive from their use. They can do more for themselves than any corps of dentists can do for them. I often tell patients in private practice that same thing.

It is not so much the matter of securing the funds, as it is of engaging the assistance of the dentists, of operators who are willing to make the sacrifice of time and energy and money incident to the doing of charitable work. Men whom we approach say, "It is a great thing, a fine thing. I am glad something is being done, but really I have not the time to do it." I appreciate that this must be so with many men recently in practice, who have their obligations to meet, and who feel that an hour or two out of practice would be a loss to them and to their families. But many men hold back and say, "I do not believe that is necessary." I think that after hearing Dr. Perry's remarks some of those men will sit up and take notice, and help in the work. If there are any so stimulated, Dr. Wheeler and I would be very glad if they would give us their names.

As far as prosthesis is concerned in clinical work, it has not yet seemed practical to us to branch out into that on account of the expense; but eventually prosthesis will be provided for the poor.

Switzerland, Germany, England, France, and Italy are older countries, and are more advanced in this work. We must expect that, as they are more experienced. I hope that in later years we can make as good a showing, and when we have been in existence as long as they have, we will perhaps have made a better record; but when we think that there are nine million children in the United States, it is a hard proposition to

suggest a plan by which they can be adequately cared for.

The point of conservative versus radical practice was mentioned, and Strassburg was spoken of as being first on the list in doing conservative dentistry for the poor. At present we must do what will prove the greatest good to the greatest number, and I find that the doctrine of the forceps must be acknowledged to a certain extent. I do not wish to go on record as favoring the extraction of a tooth that can within the bounds of practicability be saved; but if the patient's health is endangered by old broken-down shells with festering sores and abscesses, it is best, I think, not to keep them running four or five weeks, but to use the forceps. Think of all the splendid old men and women who live on without any teeth at all. That is of course not the ideal thing, but it is better than a mouth reeking in pus from broken-down and abscessed roots.

Speaking about the position that medicine occupies in the world as compared with the other professions, of course we all take off our hats to medicine. Perhaps when dentistry is as old as medicine there may be some pictures on the walls of halls like this, representing men who have been earnest and self-sacrificing and charitable in their relation to their fellow men, just as these splendid medical men have been in their relation to their profession and to humanity.

Dr. Perry justifies the lethargy of the dental profession in the past, and I think we must accept his statement, but we are turning a corner on the road of progress, and a decade from now Dr. Perry's justification will be obsolete.

We cannot say, because we are ensconced in comfortable rooms and dealing with the better class of people, that we do not know anything about the needs of the poor, now that this movement has started. You cannot take up a dental journal today without finding some article on this subject. In *Cosmos* for January 1908 (vol. 1, p. 23) there appeared a most comprehensive article by Dr. Paul Gardiner White of Boston.

Such articles will arouse interest and put this work on a practical basis.

There is one point that comes to my mind in reference to the amount of money yearly spent by the municipal government in putting in better ventilating systems in the old buildings, and new and expensive ventilating systems in the new buildings. A few breaths from the foul mouths of several hundred children will vitiate the air very quickly, and if the municipality would set aside a little money to get a free clinic for the poor, and enlist the aid of the dentists, they would be doing something of great value. Everyone knows that the breath from vitiated mouths is most deleterious to the health of children who have to live in such an atmosphere.

Dr. HODSON. I wish to correct the idea that has been conveyed by the speaker that this is all entirely new effort. Many of us older practitioners have been working along these lines in the many public and charitable institutions, though we were handicapped in many ways, for twenty-five years or more. It is new only in its suggested extension over the general public. It is not to our discredit that no systematic effort has been made heretofore. Individual members have been hard at work, and with much self-sacrifice all these years, but I am delighted that now some systematic and real effort is being made to accomplish something comprehensive.

I think Dr. Tracy hits the nail on the head when he says that our private efforts ought to be supplemented and aided by municipal interest. It seems as though this country as a whole and each city in particular ought to do something tangible to make it possible to do the work for these poor children. This is a different thing from physicians' charity clinics. They give their time for examination and prescription, and that alone; we do not. We have actual operations to perform for each patient, and in a restricted time. We could only until very recent years operate in the daylight, and even now we can do so at any other time only in special, expensive surroundings. The

physician can examine and prescribe for his patients during the whole twenty-four hours, if he can stand up long enough. Our working among the poor cannot therefore be compared with physicians' work. We can do what we can, and do lots of good; there is indeed no end to it. I am exceedingly glad to see this movement started, and to see the young men enrolled. Young men have done and do an enormous deal of this work, but in a necessarily restricted measure, inadequate to what the modern necessities require. I shall be pleased to read the paper again. It deals with its subject very carefully and very extensively. I also am glad to see that the movement is given such a good start-off by the First District Society, which is the representative society of the whole people.

Dr. JARVIE. I have listened to the paper with a great deal of pleasure and interest. The essayist is to be complimented on the immense amount of work which he must have done to gather these statistics, which he has presented in a manner that cannot but help us in the consideration of this subject.

It is very interesting because the question has passed the theoretical stage, and we find ourselves called upon to put this work of caring for the teeth of the poor into practical operation. This is not at all a new thing. Efforts have been made in this direction for a long time. In preparing a history of dentistry of Long Island, I came across a pamphlet issued by Dr. Bridges some sixty-five years ago, in which he said, realizing the necessity of the care of the teeth of the poor and recognizing the fact that they could not pay for such services, that he would render whatever dental services he could every morning from 7.30 to 9 o'clock, without any charge, and I understand he continued to do so for some years. He was a very good man, and a pioneer, as well as a leader in dentistry, in Brooklyn.

Forty years ago, the Brooklyn Dental Society organized a dental clinic, but after two years discontinued it. It seemed to become rather too onerous for

the dentists to give their services one afternoon a month as they had agreed to do. Thirty dentists entered into the agreement, and at first were quite regular in their attendance; but after a while they began to get tired of operating upon dirty, neglected mouths, for such service did not afford them the continued interest that the cases in dispensaries and hospitals have for the physician.

There is no use arguing upon the desirability or the necessity of this work. That is fully conceded. What we want to get at is some practical course by which a large number of the teeth of the poor can be cared for. There are parts of New York city, both on the East and West sides, that are crowded with people as in no other city in the world. There are blocks on the East side that contain as great a population as some cities in an area many times as large. These people are poor and ignorant; they have diseased mouths, and the consequent infection is scattered broadcast among the people whom they come in contact with. How shall we go about it? I have thought long and earnestly about this matter, but I do not have anything decidedly practical to suggest. I think that if I had given up practice when I was ten years younger, I would have gone to the East side and established a place for the care of the teeth of the poor, not with the idea of operating on their teeth myself, but to get young men, recently graduated, who should be in that establishment just as the internes are in hospitals. You cannot get this work done from pure philanthropic motives. It is very beautiful to think of a young dentist devoting himself to that purpose alone, but it is not reasonable to expect it. Why do intelligent young men who have acquired the highest places in their classes go into the hospitals and spend two years without pecuniary reward? From philanthropic motives? Not at all; they get a certain experience which they cannot get anywhere else, and it enables them to treat cases that they could not treat in their private practice unless they had had just that experience which they acquired in the hospital.

Get some young graduates to work at these dental clinics just as the internes do in the hospitals, and pay them a small salary, just enough to pay their board. The internes are paid nothing except their food and lodging, but they have the advantage of practicing under the supervision of men of ability and experience. I believe what I have suggested is quite practical. I do not know whether it is the best way; perhaps it would be better to establish a dental clinic in every dispensary. In many of the dispensaries dental clinics have now been established. I know more about the conditions in Brooklyn than I do about those in New York, but I believe that no arrangements have been made in the dispensaries for filling teeth or caring for them in any way, except by extracting and by treatment of disease conditions of the mouth. These accommodations should be increased, not at the expense of the dental profession, but the city at large should take charge of them through the taxes. The cities in continental Europe provide the money, and I think New York ought to sustain a dental clinic as it does other clinics. This, of course, might be supplemented in many ways by funds given by philanthropic people. All that dentists should be called upon to do is to provide the services. The initiative in this movement must come from the dentists. They understand as no one else the terrible results arising from a lack of dental services among the poor, and I should like to see something practical done.

Dr. CARR. I have not had the pleasure of reading the essay of the evening, and I do not think that anyone could discuss the subject intelligently without carefully reading the paper. I have been associated with Drs. Wheeler, Merritt, and others in the establishment of a public clinic, under the auspices of the Children's Aid Society, and I have gained a great deal of valuable experience from my association with them.

We have heard a great deal of sentiment expressed here tonight. Dr. Perry has told us in beautiful and graphic language what we should do, but from a

visionary and theoretical standpoint. It seems to me that we should deal with this subject in a practical manner. In establishing a clinic, we have divided the work into three departments. That is, we have "resident surgeon dentists," "visiting surgeon dentists," and "consultant surgeon dentists." We have drawn the men in the first class from young men not long established in practice, just out of college. Although these men do not remain in the building at all times, we call them "resident surgeons," because they attend the infirmary each day. The "visiting surgeons" are those men who give one afternoon a month to supervise, oversee, or give instruction to the younger men, while the "consultants" are those who are called in emergency cases.

We have experienced great difficulty in inducing members of the profession to serve on any of these boards. It has been our experience that when we approach gentlemen, and invite them to accept positions on our staff, they approve of the work very heartily, tell us that it is a very nice thing, but that they have no time.

The truth of the matter is, when a young man graduates from a dental college, unlike his medical brother, he starts out at once, takes up practice immediately, and is looking for the almighty dollar from the beginning. The medical student, on the contrary, is only too willing to give his time, and begs for the privilege of an appointment in some infirmary or clinic, in order to obtain practical experience, and in some instances is obliged to wait long for his appointment, on account of the number of applicants on the waiting lists.

I have spent nearly two years in a medical clinic, where I give one night a week, and I find from six to ten young physicians there every night, gladly giving their time to the work. If the dental graduate would do this, he would be a better man and a better dentist with a very large experience in two years.

It seems to me that we should enlist in this work the services of young men as they graduate from the dental colleges,

before their time is so valuable that they cannot afford to give up ten, fifteen, or twenty dollars an hour.

It should be remembered that occasionally patients in comfortable or even affluent circumstances attend these clinics, and in many instances young men make acquaintances and form connections which lead to a very lucrative outside practice. Many prominent physicians in this city have built up very large practices in this way.

I intend to offer a resolution this evening, and I hope that it will meet with your approval, namely, that a committee of five be appointed to confer with the Society for the Improvement of the Condition of the Poor, the Children's Aid Society, and the hospitals, with a view to the establishment of free clinics in the various institutions, and ultimately, we should have these in the hospital wards of the city.

The older practitioners can easily organize, acting as chiefs of clinics, while the younger men do the work under their supervision. The great difficulty is the lack of interest displayed by members of the profession itself. Dr. Wheeler can testify that Dr. Dunning and myself have been acting as a committee for the past three months, actually begging men to join the clinic—and some of those whom we have begged are here tonight—men who turned a deaf ear to our requests. While Dr. Perry was making his pathetic speech, I wondered how many of those who applauded him, and told us that this was a very nice thing, experienced a change of heart, and said to themselves, "I will volunteer." I do not believe that one of you did. This work cannot be done by individuals, it must be done by the profession, and both as individuals and as a profession you should give your assistance to organized institutions.

If I were to start a subscription here tonight, and ask for twenty-five dollars for the support of a free public clinic, most of you would go out. Why is it that today we have no dental department attached to any of our great universities?

Simply because of the lack of professional loyalty and pride among us.

This building in which we meet was not raised by the clergy, it was erected by the members of the medical profession themselves. The trouble with us dentists is that we are not doing anything for ourselves.

In this large city there should be three great dental departments of our universities, but, gentlemen, this dream will never be realized unless the necessary impetus comes first from the dental profession. I have been raising money during the past few years for a dental institution in this city, hoping that some day it may become a department of a university, and every dollar has come from the laity, not one cent from the members of the dental profession.

I hope that some of you may become so interested tonight in this work that you will be willing to devote a little time to a good cause, say, one hour a month, and if you do, and will report to either Dr. Dunning or myself, we shall be glad to enroll you as clinicians, and assign you to duty in our public clinics. In line with these few words, I move that a committee of five be appointed to consult with the Society for the Improvement of the Condition of the Poor, or any other society. We cannot get money from the municipality unless we show that we ourselves are willing to do something, and then we will get the money.

Dr. Carr's motion was carried.

Dr. WHEELER. I am greatly pleased with the paper, and with what Dr. Perry, Dr. Jarvie, and others have said, and I am more than pleased with what Dr. Carr has said. If you can find men who will give two hours a month to the work, I can find people who will give the money. I have been unable to find men to give their time to the little clinic on West Fifty-third st. Dr. Perry and Dr. Jarvie said that they hardly knew just what to do. The way to get a thing done is to do it. We have gone at it earnestly in our little clinic, making use of our experience and modifying our ideal as it seems best. We can go ahead. I know

from five years' experience in the clinics that there are not enough dentists in the city of New York to do the work, but nevertheless we should do what we can.

I believe in order to make this movement a success, it will be necessary to obtain municipal assistance; in order to obtain that, it is necessary for the dentists to get together and show that they are in earnest, and they must do something besides coming here and talking about it. They must give some of their time, and the best way is to give your name to Dr. Tracy, or Dr. Carr, or Dr. Dunning. The Children's Aid Society, which furnishes the money to carry on this work, has established a well-organized force, and a committee has been appointed to take the names of all those who are willing to serve. Dr. Carr, I think, is the chairman of that committee. They will be glad to enlist the names of any of the young or older men who will take an interest in this work. There are three classes of dental surgeons there: The attending dental surgeons, young men just out of college, whose time is not fully occupied, and who give half a day, or three or four hours out of that half day per week; then there are the visiting surgeons, who give half a day a month, and the consulting surgeons, who are the men who have attained the age where it is hardly fair to ask them to give up their time, but hold themselves in readiness to give their advice to any of the younger men who are puzzled about any case, the latter being privileged to go to the older men for their opinion. The names are posted in the clinic room, so that the young men may have their choice.

Dr. Hodson said the dentists could only work during the daylight hours. In St. Bartholomew's clinic there was more work done at night than during the day. Proper light was secured, and the greater part, probably two-thirds, of the work was done there at night.

I would not suggest anything more than has been said by the gentlemen who preceded me. If the First District Society, the Second District Society, and the other societies could get together,

and show that the dental profession is interested in the matter of discharging their obligations to the public who are unable to pay them, the public will assist us with contributions. I know that the Association for Improving the Condition of the Poor will do all they have suggested in the letter to Dr. Perry, and so will the Children's Aid Society, and the charitable organizations in general. The committee on the Physical Welfare of Children is preparing to take up the matter before the municipality in due time, but if we do not do something they will ignore the dental profession unless we take an active interest and attempt to co-operate with them.

Dr. PERRY. Dr. Carr has made an important suggestion, the aid of the Charity Organization. I hold in my hand the report of the organization for last year. As I said to you, help can come to you tomorrow from this source if you choose. When your committee is appointed, willing to seriously consider this matter, I feel sure that these clinics will be helped by the Charity Organization.

Dr. WHEELER. I wish to take exception to the absurd position of Dr. Rhein. He says that we are making paupers of the people whom we are serving on the West side. Those people are so poor that the Children's Aid Society has to buy clothing for their children to enable them to attend the schools. They simply could not pay for any dental services; but if we could preserve their teeth for a number of years, so that they would become wage-earners, they would be likely to become patients of the dentists who practice near where they live, or even of those dentists who receive higher fees. We are not making paupers of them, but we are helping them until they can help themselves.

Dr. DAILEY moved that the discussion be closed. (Motion carried.)

Dr. ZENTLER. My thanks are equally as hearty to the gentlemen who upheld this plea as to the one who opposed it. Anything worth while is worthy of opponents as well as partisans.

Dr. RHEIN. With due deference to the essayist, I have not opposed his paper. I

have been heartily in sympathy with it, and object to any such construction.

Dr. ZENTLER. If Dr. Rhein states that he has not opposed the plea, then I retract the thanks to the opponent, there being none, but I understood Dr. Rhein to oppose the plea on the ground of pauperization. Free clinics do not pauperize any more than does free education, and who would think of opposing free education on this ground? Mr. Bruère, the general agent for the Association for the Improving the Condition of the Poor, has in connection with my efforts to interest the association in the establishment of free dental clinics written me a letter, which Dr. Perry has mentioned and asked me to read. I take pleasure in doing it:

NEW YORK, March 5, 1908.

DR. ARTHUR ZENTLER, 265 Central Park, W., City.

My dear Dr. Zentler,—Permit me to thank you for your very interesting letter with regard to the extension of free dental clinics in the city of New York. Any movement which will forward the education of the people in their physical welfare must result in great good to the community. Has it never occurred to you that in former times we were able to instruct people how to protect themselves against wolves, floods, and fire by devising such stories as that of "Little Red Riding-hood," etc., which educated them to self-protection from the time of their childhood? Today our children and our entire working population are surrounded by dangers much more formidable and insidious than wolves and floods, about which they are almost entirely ignorant, and against which, therefore, they cannot protect themselves.

The establishment of free clinics, like the establishment of free schools, is one of the indispensable measures which the community must adopt to protect itself from waste of life. The way to pauperize people is to allow them to become victims of tuberculosis, malnutrition, and all those disorders affecting their general well-being which arise from uncleanliness of all kinds, among which the uncleanliness of the mouth, with its inflammatory, infectious processes is one of the most serious. The great pauperizers in our community are poverty and disease, not care such as free clinics could give, or education, such as not only schools, but clinics, too, might give. I sincerely hope that you will be suc-

cessful in interesting the members of your profession in the extension of free dental clinics. It would be a tragedy if America, which took the initiative in the organization of dentistry, should fall behind Europe in the application of dental knowledge to the care of the community. Mr. R. Fulton Cutting, president of the New York Association for Improving the Condition of the Poor, has instructed me to say that he is in hearty sympathy with your plans.

Mr. Bruère goes on to say that to bring before this society such a resolution as I sincerely hoped someone would bring, and which Dr. Carr did, would be a very good thing, and as Dr. Perry told you, the association would be very glad to help us.

In conclusion, I wish to say that I worked out a suggestion which is similar to what Dr. Carr said, in reference to the appointment of a committee in this matter, and with your permission I will read it:

That a committee be appointed by the chairman to get in touch with each member of this society and with the chairmen of other societies, so that they may in their turn appoint committees to confer with each member of their society, and find out in this way how much time everyone is willing to give in actual service to free clinics; to tabulate, then, these volunteers according to the districts where hospitals and other clinics exist; and then the committee shall by all possible means exert influence upon the boards of trustees of the various healing institutions, and obtain their consent for establishing the right kind of a dental clinic in each and every one of them, showing them that the necessary staff for efficient services is already secured. The committee shall finally approach all the various manufacturers and dealers in dental equipments and supplies and try to obtain from them in the form of donations such requisites as are most necessary for the establishment of such clinics; the remainder can be acquired gradually from endowments, which are bound to come, as they did to all other institutions for public utility, as soon as the result of the good work will be seen by the public and the authorities.

As has been said, the city authorities will not start dental clinics before the

dentists will show that they are needed. When that is shown, they will see it to be their duty to assist them.

The secretary read a communication from Dr. Haven Emerson.

The secretary read a communication from the New York Institute of Stomatology, inviting the members to attend their meeting on April 7th, to listen to a paper by Mr. Horace Fletcher, entitled: "Modern Dentistry as Preventive Medicine."

Dr. LeROY. I would move a hearty vote of thanks to the essayist, and also say that that letter of Mr. Bruère is of such importance and contains such senti-

ments as might be very well given to the public, and be published in the press.

The motion was carried.

NOMINATIONS FOR OFFICERS.

(To be voted for at next meeting.)

For President—Dr. J. W. Taylor.

Vice-president—Dr. B. C. Nash.

Secretary—Dr. H. L. Wheeler.

Treasurer—Dr. H. R. Armstrong.

Librarian—Dr. M. C. Tracy.

For delegates to the State Society—Dr. Herbert L. Wheeler, Dr. Alexander Currie, Dr. Hugo Rettig, and Dr. Reffsum.

There being no further business, the meeting adjourned.

HERBERT L. WHEELER, *Secretary*.

PENNSYLVANIA STATE DENTAL SOCIETY.

Fortieth Annual Meeting.

(Continued from vol. 1, page 1260.)

TUESDAY—*Evening Session.*

THE meeting was called to order at 8.30 o'clock, Tuesday evening, June 30th, by the president, Dr. Filbert.

Dr. I. N. BROOMELL read a eulogy upon Dr. H. N. Young of Wilkes-Barre, whose death had occurred since the last meeting.

Motion was made and carried that the society take special action on the death of Dr. Young.

The next order of business as announced by the President was the reading of a paper by Dr. G. V. I. BROWN, Milwaukee, Wis., on "The Surgical and Therapeutic Aspect of Maxillary Readjustment with Special Reference to Nasal Stenosis, Hare-lip, Cleft Palate, and Speech."

[This paper is printed in full at page 7 of the January issue of the Cosmos.]

Discussion.

Dr. TRUMAN W. BROPHY, Chicago, Ill. A number of years ago I presented a paper on an original method of closing congenital cleft palate by means of pressure, and it has been my good fortune to find members of the profession all over the world accepting this method of procedure. The gentleman who has just so learnedly addressed us has hitherto hesitated in accepting it, but I am very glad to know that he has at last come to the conclusion that pressure is the proper method to use in bringing about these most excellent results. The question of using pressure for spreading the bones is along the same lines as those which we pursue in moving the bones together. The plan that I designed was to bring the bones together by pressure and hold them there by suturing them through and through. The plan sug-

gested by the essayist this evening in spreading the arch is the exertion of pressure upon the teeth. Since the infant has no teeth we make use of the plan of bringing the parts together by means of pressure, and so securing the results which have proved so satisfactory to the surgeons throughout the world. I have had no experience myself in spreading the bones for the purpose of relieving the difficulties which arise from the closing of the nares, or in other words, for correcting nasal stenosis, and I cannot make definite statements without having had an opportunity to make observations extending over a longer period of time than that which the essayist has employed in doing this work. A great many cases must be examined, and observations extending over a long period of time be made, to determine whether that is the method that will ultimately be accepted by rhinologists in relieving the distressing conditions observed in mouth-breathers. The reason why one breathes through the mouth is because nasal breathing is difficult, and in some cases it is quite impossible.

The author of the paper speaks of arrested development in regard to the palate, the lip, and the parts which enter into the mechanism of phonation. I wish to answer that statement, and if I am wrong I want to be corrected. My answer is that, with rare exceptions, in cases of cleft palate there is never absence of tissue, there is no interrupted development, there is no arrest of development; there is no arrest of development in hare-lip, there is no arrest of development in cases of protruding premaxillary bones; it is the failure of union of these parts, and the beautiful pictures that the gentleman has shown on the screen will enable anyone who will study the matter to see that the statement which I have made, especially with reference to the pictures he has shown, is absolutely correct. Hare-lip and cleft palate are not the result of defective development of tissue, arrest of nutrition or arrest of development, but the result of failure of union. Now we naturally turn to the cause of this failure of

union, and in our search for it we can trace it, and in the pictures on the screen I can point out what I believe to be the cause of cleft palate. I have presented this theory to a number of embryologists of international reputation and I am glad to say that these gentlemen believe that the theory which I advance is correct, although we cannot prove it, because we have no opportunity to study these cases in embryo. Since we know nothing of the coming of a child with cleft palate until it is born, we have no chance to know what is going on during the process of development, but we can see much from the manner of development and from the application of force exerted. Cleft palate in my opinion may be influenced to some extent by heredity, but more particularly by the application of force, and that application of force is due to the pressure of the mandible against the inclined planes which form the arches of the upper jaw, as will be shown to you in the pictures that I will place upon the screen. I regard these slides as very excellent ones in demonstrating this point, and I want you to keep in mind the breadth of the upper jaw and the position of the tongue. [Dr. Brophy then showed a number of slides illustrating this point.]

The essayist said that in the case exhibited the lip and palate were operated upon at the same time. I cannot see how any surgeon would undertake such an operation as that. We all know that it is enough to make one operation at a time. I always first perform the operation for closing the hard palate in an infant and then operate for the hare-lip. An English surgeon has gone beyond the position that I have taken and operates the second day after birth, forcing the bones together with the finger and holding them there. I usually wait until the tenth or twelfth day, when we know all the organs of the body are operating normally; then it is very easy to move the maxillary bones together. I have performed this operation for about fifteen years and have had great success with it. A surgeon of Paris says the

reason why the patients do well under this operation is because there is no hemorrhage. In the operation for cleft palate we have no hemorrhage of consequence if this method is followed properly. If I disturb the teeth, this I think is overbalanced by the advantages derived from the operation. The premaxillary bone should never be removed, and in order to clearly show the fallacy of removing the premaxillary bone in the performance of these operations, I will venture to occupy just a few more minutes of your time in placing upon the screen a few slides which I obtained from a friend of mine in London, who procured them from the various museums of England, Ireland and Scotland, and France, to show the condition which is constant in cleft palate—the bones are invariably spread and there is no absence of tissue. [Dr. Brophy then showed a number of slides illustrating this point.]

I feel, gentlemen, in all sincerity that if operations for restoring these little patients to normal conditions result in a failure, this failure is due to faulty methods. I am glad to know that the gentleman who has addressed you tonight has come to the conclusion that it is proper to apply pressure in bringing about normal conditions in these cases. Possibly someone will sometime devise a better way of bringing the hard palate together than the one which I have designed and which I still practice, of moving the bones together and suturing them. In young infants it is so easy to unite these bones, and there is no reason why every surgeon should not do it and bring about these beneficent results.

I thank you, gentlemen, for the courteous attention you have given me.

Dr. W. J. ROE, Philadelphia. As a member of this society I take great pleasure in welcoming Dr. Brown and Dr. Brophy, and I think we are especially honored in having them present with us. It has been an unusual occasion and one that I appreciate highly, and I take great pleasure in welcoming them here also as members of my own alma mater. I have watched their good work for a

number of years, and as I must confess tonight, not as closely as I should perhaps have done, because the work of Dr. Brown which he has outlined to us tonight in respect to his method of treating nasal stenosis is a new departure, and I welcome it because whether it is all that is desired or not, it is worthy of our thorough consideration. I have for many years thought that to obtain greater breathing-space—which I believe to be important in a number of cases at least—there should be methods other than those at present employed by rhinologists. I heartily welcome this method and I shall consider it very seriously and thoughtfully before I accept it fully or before I criticize it severely. I believe that this is a valuable field and an advance, and I think that Dr. Brown is deserving of great commendation for entering a field that is new and that has not heretofore been entered to my knowledge. There is no question in my mind that the work that he has spoken of tonight is practical and of very material advantage. It is not possible for me to discuss it as I would like to, owing to the late hour and to the knowledge that several gentlemen are to follow me whom I am very anxious to hear. This work certainly has a field and a valuable field. While the therapeutic value of widening the nasal space is too comprehensive to be discussed here, I will say that I believe it is necessary to have something other than the methods employed at the present time. I have always questioned the practicability of some of the methods employed by some of our present-day rhinologists, but I have had no experience in this line and can therefore only speak in perspective, but I have had experience in regard to the other conditions referred to.

Dr. Brophy said, and Dr. Brown demonstrated, that the premaxillary bone should never be removed. I heartily indorse that, as I have never yet seen a case where it was necessary, nor a case that could be dealt with practically, scientifically, and surgically after the removal of the premaxillary bone. This bone is unfortunately too often removed,

thereby creating a deformity that cannot by any possible method be corrected. With this Dr. Brown and Dr. Brophy will probably agree. If treated surgically and properly the existing deformity can practically be entirely corrected by the proper adaptation to the correct position of the premaxillary bone, and it has been my experience in dealing with the premaxillary bone to try to bring about a slow process of replacement by pressure, or by taking out a portion of the septum posterior to it.

Dr. Brown referred to a class of cases that are unfavorable for surgical intervention—or rather to some cases of hare-lip and cleft palate that could not be properly treated by surgical intervention. I question whether he meant it in that way. Judging from my own experience, and from that of others, I maintain that at the present time there are practically no cases of such deformity that cannot be successfully and scientifically treated by surgical intervention. If they are too wide to be approximated by the different operations that are successfully performed at the present time, we have means of gradually bringing the maxillary bones together, or we may apply the more rapid method of the Brophy operation. I am glad to say that I know of no man on this continent who has done as much to stimulate and to develop the technique and surgical treatment of cleft palate as Dr. Brophy of Chicago, and second in this most important and beneficent field is Dr. Brown of Milwaukee. I have watched their work, and have benefited from them every time I have come in contact with them; I have practiced accordingly, but I am not ready to fully accept all of their theories. I may probably do so next year, but at the present time I am not ready to accept the theory that all cases of cleft palate are due to want of union, and that the tissue is all present, and that they are not due to arrest of development. I am in a sort of formative stage, ready to change my opinion at any time, and I find that I am changing from year to year. I have tried the Brophy operation with a de-

gree of success, but not with the degree of success that Dr. Brophy has met with. This is probably my fault. I am working along lines similar in some respect but different in technique to a considerable extent. I believe, as I said, that all cases can be closed. I find cases where there is an abnormal separation of the maxillaries, and I have a photograph with me showing one of the most marked examples of abnormal separation of the maxillaries, where there was deformity of the face due to the maxilla being carried outward and also downward; this is one of the most marked examples of this separation that I have seen in my experience. I operated upon this case by the Brophy method, as I think no other method would have been successful. I have seen cases where the separation was of a less marked degree, cases in which so far as my judgment goes there was no displacement of the developmental tooth germs, which were in their normal relations. I have watched such cases until the eruption of the deciduous and the permanent teeth, and I find that the teeth erupt in normal relation. Therefore I am not ready to accept the theory that these cases are all due to separation, and that they should all be treated by one special method. This has not been advocated, however. I believe in selecting the best method for every individual case, whether it be the Brophy method or the Langenbeck operation or any other method.

Just one other point. I have called attention to the possibility of closing every case, in which I firmly believe. At the present time, from the discussion tonight it is evident to all that the science of oral surgery pertaining to deformities of the maxillary bones is not a complete science nor a perfected art, and yet I find that the best ideas upon this subject prevail in the dental surgical profession. It is too often the case that the general surgeon thinks of nothing further than the closing of the cleft. The parents are too often perfectly satisfied if the cleft is closed, and we see the results of the simple closure of the cleft. Now we have gone beyond that

stage. At the present time it is not simply the closure of the cleft—it is not the operator or the technique of the closure of the cleft that is in question; it is the duty of the operator and the technique to close the cleft and to maintain the highest possible degree of function of all the organs, and any operator who operates for the closure of the cleft disregarding the function of the associated organs should not be employed at the present time. That is the stand I take, and I am glad to say that by the development and the advance attained at the present time it is possible to close the cleft and to maintain almost perfect function and the restoration or preservation of the normal relation of the features of the patients.

Dr. G. HUDSON MAKUEN, Philadelphia. Gentlemen, this is a very important subject and one in which there is a great lack of knowledge not only on the part of the laity, but on the part of the general practitioner of medicine and surgery as well. Only the other day the professor of anatomy in one of our leading medical schools brought to my office for consultation a boy with defective speech. The patient was a stammerer, and after an examination of the organs of speech, I said to the professor, "There are three things in this case that will militate against the acquirement and development of free speech," and he said "What are they?" I said "They are first, irregularities in the palatal and alveolar arches, and in the teeth; second, enlarged faucial and pharyngeal tonsils, and third, a deflected nasal septum." "Well," he said, "I have seen only indifferent results following the removal of tonsils and adenoids and the correction of the nasal septum, and of course," he added, "the conditions in the mouth cannot be changed."

This was the opinion of a distinguished anatomist and surgeon. I have consulted with distinguished dentists in reference to this and similar cases, and I have been informed by one that the correction of the dental and alveolar irregularities should begin at an early age, and by another that it should by all means

be postponed until after the eruption of the permanent teeth. So it seems, gentlemen, that we are not agreed on this subject, and therefore cannot discuss it too often on occasions like this. There is one thing of which I am firmly convinced, namely, that the correction of all oral deformities, whether they be deformities of the teeth, the alveolar arches, or the palatal arch, should be made as early as possible, consistent of course with the patient's safety. There are two reasons, as Dr. Brown has well said, for closing a palatal cleft. The first aim is to conserve and improve the health of the patient, and the second, to favor the development of normal speech in young children and to improve the speech in adolescent and adult cases. In giving reasons for the operation I would put the improvement of speech even before that of health, because I believe that the improvement of the speech in these patients is of primary importance and that it does more than anything else for their general uplifting and upbuilding. The closure of a palatal cleft improves the character of speech in two important particulars, namely, in resonance and in articulation. It is well known that the resonance of the voice may be impaired by a very slight oral irregularity; even a dental filling that is not of the same density as the tooth affects the voice to some extent, but the impaired resonance resulting from a cleft palate is characteristic, and is due to improperly formed oral and nasal resonance chambers. This impaired resonance can be changed to the normal resonance only by giving to the patient a normal palate, which, of course, is quite impossible, and in adult or even adolescent cases a perfect palate would not improve the resonance to any great extent until its proper functions were acquired in the production of voice and speech.

I was very much interested in Dr. Brown's reference to the operation for widening the nostrils. My attention was first called to this in New York a year ago by some medical friends of mine, when I tried to ascertain whether it was possible to widen the nares in the man-

ner that has been referred to tonight. Dr. Brown has shown us that it is possible to do this, but he has not demonstrated that it is altogether practicable. He has shown that it can be done, but not that it ought to be done. I myself am in doubt as to whether it should be done in many cases. I see many cases of nasal stenosis but I do not see many in which I think the nostrils are too narrow. Take, for instance, the man to whom Dr. Brown referred who was hit on the nose by a baseball. In all probability that man's nostrils were not too narrow, but one nostril was too narrow and the other too broad, and our aim should be to render them of equal width by re-fracturing the septum and placing it as near as possible in the middle line. We should always keep in mind that it is quite as unfortunate to have too much breathing space in a nostril as to have too little. Therefore this operation, while very ingenious and very beautiful, should to my mind be limited in its application.

I should like to speak at length of the physiology of normal speech and also that of cleft-palate speech and to show you how the latter may be improved by training, but the hour is too late and the subject is a large one. I shall therefore merely take sufficient time to show you a patient who was seven times operated upon under ether for the union of a cleft palate. The first operation was performed when the patient was twenty-six years of age. I admire the surgeon who performed seven operations for the correction of a defect, but I still more admire the patient who submitted to them, and I should like to have you note the excellent speech which this patient has acquired by persistent practice and training. [Here followed the exhibition of the patient.]

Dr. FRANCIS ASHLEY FAUGHT, Philadelphia. I consider myself very fortunate in having been able to be here this evening and to hear from Dr. Brown the exposition of his method of treating these conditions. I have followed his work more or less closely and have always been interested in it, but I did not

realize until this evening the actual mechanics of the methods which he employs.

In his paper he spoke of the necessity of ascertaining the presence of nasal obstructions in the treatment of the cases mentioned. I think that this is the keynote of success in the treatment of all these cases. If we attempt to regulate without removing nasal obstructions that are present, we waste our energy, because, if the obstruction continues to exist, the muscular forces which were originally active in producing the deformity are still operative, so that after the removal of the appliance the conditions greatly favor a return of the deformity. This means that the rhinologist should consult more freely with the specialist in dentistry—the orthodontist—in order to determine the original cause of the condition, then by removing the cause and correcting the oral and dental conditions the result will be permanent. This necessity is brought out prominently if we consider that among the school children of Philadelphia there are over seventy per cent. who have some form of nasal or pharyngeal obstruction, and that of these cases presenting obstructions, seventy-five per cent. show enlargement of the tonsils and adenoids. This simply indicates that in no case should an operation be attempted until the presence or the absence of any nasal obstruction has been demonstrated.

I agree with Dr. Roe in his statement that he could not agree that there is always a simple separation and not an arrest of development in these cases of cleft palate. It seems to me that from the beginning the normal function of these parts has been interfered with, and if this is the case, normal growth cannot take place, because normal function implies the continuance of proper development. Dr. Makuen has shown how important this factor is in relation to speech. We apply the corrective appliance to the teeth, and as Dr. Brown has shown, it produces separation of the intermaxillary suture, but the total amount of space gained can hardly account for the great improvement in the nasal respiration. I believe that by

separating the intermaxillary suture we start a process which allows nature to assert itself, and continued improvement in breathing results from stimulation of vital forces, *i.e.* nature steps in where the mechanical process ends and eventually produces a nasal cavity with natural respiration. Furthermore, when there is a post-nasal obstruction, and Dr. Brown forces the two bones apart, no matter to what distance, he does not affect the relation of the adenoid mass in the nasopharynx. This mass very frequently projects into the nasal chambers through the posterior nares. It is therefore absolutely necessary that a preliminary investigation of the nasal cavities and the nasopharynx should precede any corrective measures, and if obstructions are present they should be removed. This, I think, very conclusively demonstrates the importance of the point that I first made, namely, that if we would successfully treat this class of cases, which is no small one, we accomplish the best results for ourselves and for our patients if the dentist and the rhinologist work in conjunction. They must compare notes and results and help one the other by observing the cases together. We must send our patients to the rhinologist first, and have the obstructions removed, and only then the treatment of the dental conditions should follow. We must realize that the treatment of these conditions should include the treatment of the dental condition plus the treatment of respiratory obstruction.

Gentlemen, I thank you for the opportunity of making these remarks.

Dr. BROWN (closing the discussion). I shall not take up the time of the audience by further discussing this subject, but simply wish to thank Dr. Brophy and the other gentlemen who have discussed the paper for their courteous expressions, and also the young lady who was kind enough to speak to us. I congratulate Dr. Makuen on the result obtained in his patient. It has given me much encouragement, and I know it will be a source of encouragement to many others.

I agree with Dr. Roe that there are no

cases of cleft palate that cannot be closed, and I tried to make that clear in my paper, but difficult cases can be greatly simplified by the methods I described.

I hope that we have accomplished something in this discussion which may ultimately prove beneficial to this most pitiful class of patients, and I trust the patient attention of my audience, which I appreciate very greatly, may thus receive its due reward.

Dr. TRUMAN W. BROPHY, Chicago, Ill., then gave a lantern demonstration of some morbid pathologic conditions of the mouth of dental origin, the method of diagnosis, and the treatment of these conditions.

The meeting then adjourned until Wednesday morning.

WEDNESDAY—*Morning Session.*

The meeting was called to order by the president, Dr. Filbert, at 10.30 o'clock Wednesday morning July 1st.

The first order of business was the report of the Committee on Revision of the By-laws, which was read by Dr. J. G. LANE, chairman.

Dr. MERSHON. I move that the Council be instructed to appoint a Reorganization Committee of three members, who shall have full power to appoint subcommittees for carrying out the reorganization of the society.

The motion was carried.

ELECTION OF OFFICERS.

The next order of business was the election of officers for the ensuing year, which resulted as follows:

President—C. B. Bratt, Pittsburg.

First Vice-president—W. D. De Long, Reading.

Second Vice-president—C. C. Walker, Williamsport.

Recording Secretary—L. M. Weaver, Philadelphia.

Corresponding Secretary—V. S. Jones, Bethlehem.

Treasurer—W. A. Spencer, Carbon-dale.

Members of the Executive Council—J. G. Lane, H. E. Friesell, and G. F. Root.

Board of Censors—E. W. Bohn, Reading; W. C. Scott, Lansford; C. C. Taggart, Pittsburg; W. H. Fundenberg, Pittsburg, and W. C. Middaugh, Easton.

Board of Dental Examiners—C. B. Bratt, C. V. Kratzer, W. H. Fundenberg, and H. C. Register.

The Auditing Committee then reported that they had examined the Treasurer's books and found them correct.

The meeting then adjourned until 2.30 P.M.

Afternoon Session.

The meeting was called to order Wednesday afternoon at 3 o'clock by the president, Dr. Filbert, July 1st.

The first order of business was the report of the Council, which was on motion adopted.

The next order of business was the report of the Board of Censors, which was on motion adopted.

The next item on the program as announced by the President was a paper by Dr. C. R. TURNER, Philadelphia, on "Some Considerations Concerning Artificial Molars and Bicuspid Teeth."

[This paper will be printed in full, with illustrations, in the next issue of the Cosmos.]

The next order of business was the reading of a paper by Dr. G. E. PFAHLER, M.D., Philadelphia, on "The Use of the Roentgen Rays in Dentistry."

[This paper was printed in the September 1908 issue of the Cosmos, vol. 1, page 916.]

Discussion.

Dr. SINCLAIR TOUSEY, New York city. I have been very much interested indeed in Dr. Pfahler's paper. Some parts of the technique are new, original, and very valuable. The phase which appeals to me especially is the placing of the tube behind and to one side, getting a pic-

ture of both antra for comparison. There is another method of doing this by having the tube directly behind the head, which method also gives good pictures. It is, however, a great deal more difficult than the position which the author describes, and does not give so good a picture of the teeth combined with the antrum picture.

In regard to the curative effect of the X ray, I find that it has a beneficial influence upon cancerous cases. I remember a case of cancer developing in the gums. The patient was an old lady who, in consequence of irritation from a blow, developed cancer of the gum; the whole upper margin of the gum looked like a mulberry, and every shiny nodule represented a cancerous deposit. I kept her alive and well—that is to say, as well as a person could be at seventy-five years of age and suffering from an incurable disease; but I kept her alive for two or three years by means of the X ray, after the surgeons had decided that no operation would improve the conditions. The curative effect of the X ray in cases of neuralgia is of course extremely interesting to the dentist. Some of these cases will get well from a simple application of the X ray. It is useful in excluding causes of neuralgia, such as pressure from a tooth in malposition. After diagnosing the condition, the X ray is applied, and in a certain number of cases a cure of the condition can be effected. I am now treating a patient who was operated upon for tic douloureux by the resection of the inferior dental nerve, after which the pain returned as bad as ever. The X-ray treatment was applied in this case directly over the resected portion of the nerve, both from the outside and inside, with a view toward causing a deleterious effect upon the newly forming nerve fibers between these ends, and the result has been very gratifying indeed. After about three months' treatment he reports that he now passes as comfortable days as he did before the trouble started.

I can corroborate what the essayist says in regard to the value of the X ray in the treatment of pyorrhea, and I think

that the dental profession hardly realizes the value of this treatment of that condition. In a case of treatment of pyorrhea by application of the X ray, I frequently commence with the violet ray, and after the first treatment ask the patient if he has noticed any effect. He will say that the only difference is that he has no pain. I have repeatedly seen cases in which three weeks' application of the X ray has caused the suppuration and diseased appearance of the gums to disappear, and the teeth become solid and painless. This does not mean that the X ray will take the place of scaling and of the other treatment which the dentist applies, for the latter is the principal thing. But cases which do not get well with the dentist's treatment will often get well with the X-ray applications added to that. Furthermore, if there is a return of this intractable disease, one or two applications of the X ray will control the trouble. The X-ray treatment does not have to be continually performed for the rest of the patient's life. It seems to have a very lasting effect.

I have had the same experience as Dr. Pfahler in the benefit of the X ray upon necrotic conditions. I have one picture, in which the probe enters the cavity of the tooth, goes through the root-canal, through the fistula in the bone, and comes out through the nostril. Two or three pictures which I took of the patient produced sufficient change in the nutrition of the parts to cause the fistula to heal, and the case was cured without any operative treatment whatever.

The danger of X-ray examinations must also be borne in mind. I do not think that it is practical for the dentist to install an X-ray apparatus in his own office and to do his own work with it. If he wishes to make a specialty of the X ray, he will probably make a better specialist for dental diseases than anybody else in the world, but if dentists do not make a specialty of it, they had generally better send the patients to the X-ray specialist. The dentist is not in the same position as the surgeon; the latter can make successful examinations

for fractures, etc., without being an X-ray specialist. This work requires extremely good technique, and the dentist has as a rule neither time nor proper facilities for perfecting himself in the work. Of course, only the portion to be examined is to be exposed to the X ray, and the operator should be extremely careful about exposing himself. I think the danger to the operator is greater in this work than in general work. I know that in spite of every precaution that I can take, I have had some disquieting effects on my own hands; this seems to be inevitable, and there are a great many men who have had most serious effects from this work.

I agree with Dr. Pfahler when he says that the fluoroscope is a bad thing. I have a fluoroscope of my own which, like a mouth-mirror, is to be held inside the mouth; the X ray shining through gives an image upon the surface and in a dark room you can see an unerupted tooth at a single glance. I use the fluoroscope in patients in whom an unerupted tooth is suspected, and who come from a distance, so that it is inconvenient to make a second examination. I sometimes take a look at the conditions with the fluoroscope, and if I see the unerupted tooth, and see it in the position which I know will be covered by the picture which I am to take, I am content; but if I do not see the tooth in the position that I know the picture will cover, I take a series of pictures, in order to have a record which will prove that the tooth is to be found nowhere. I think myself that the fluoroscope is exceedingly dangerous to use, yet for a single glance I am inclined to use it. I take a great many pictures on a horizontal projection instead of holding the film vertically inside the mouth, and very frequently I take a picture with the film horizontal in the mouth, the patient simply holding the film by closing the lips and teeth upon it. This is a great convenience, whereas pressing against the palate is disagreeable. The film is put in the mouth, and the X-ray tube placed at such a height that the shadow will give the natural length of the tooth; this affords

a wider area than the small film held against the teeth.

The antrum offers an interesting study, and I have made some pictures which I will show tomorrow representing the antrum filled with lead, and a radiograph made through the head to show the comparison of other pictures made of the patients.

I have made a number of measurements of the permanent teeth in children from five to six years of age, by means of the X-ray picture taken of these teeth, while the deciduous teeth are still in position. Those that I will show were made about two years ago, and I have made measurements of these unerupted teeth by means of calipers graduated to hundredths of an inch. Since then I have made the actual measurements of the erupted teeth in position, and find uniform results. There is a uniform enlargement in the picture of about ten per cent. I think this will be valuable to provide for early regulation of the teeth in cases where the X ray will show that the child with a small arch is going to have large teeth and *vice versa*.

Dr. A. R. DRAY, Philadelphia. I wish to discuss this paper especially from the standpoint of the dentist, in order to get out of the essay that which is of real value to the dental profession. We have heard a great deal of the medical and scientific aspect of this subject, but the X ray is of great use to the everyday practitioner. I shall therefore briefly review the paper and bring out those points that chiefly interest the dental profession. First of all I wish to say that the X ray is not necessarily a dangerous agent when brought into use in dentistry. It has been my experience that many patients preferred not to submit to X-ray examinations on account of the danger. I think that this is a false impression, as Dr. Pfahler has correctly brought out in his paper. In the second place, Dr. Pfahler maintains that the X ray is not new in dentistry. As a common, everyday dentist, I think that to a large number of the dental profession the X ray is new. That is, it is not new perhaps from a general standpoint, but

from the dental standpoint it is new to a large number. This must be said to our shame, for the X ray is one of the most valuable agents we have, and I think that we may make valuable use of it. The author also mentioned three features of the X ray which also bear weight in our work, namely, that it is painless, aseptic, and accurate for the purpose of examination. These valuable points should be borne in mind by the dental operator. I do not think that the essayist laid enough stress upon the fact that this work should be left to the expert, as stated, but the gentleman who preceded me emphasized the fact that the X-ray machine should be used with great care, and only by those who understand it. All things are dangerous in the hands of the novice, but that does not mean that it is necessarily dangerous if left with the expert. I do not think that the dental profession has a large enough field for the X ray to make a specialty of it, unless an operator has plenty of time to leisurely do so. It had better be left alone, if it is not done thoroughly.

The essayist divides his paper into the diagnostic and the therapeutic points of value. He speaks of the diagnostic value of the X ray in the detection of old roots. This feature has in my experience been very valuable. Several cases were cited this afternoon where obscure conditions were found to be due to the presence of an unrecognized root. Another very valuable agency that the X ray has is the detection of unerupted teeth, the localization of teeth in orthodontia. I am exceedingly sorry that Dr. Cameron is not here this afternoon, because I am sure that he is an enthusiast over the use of the X ray in his specialty, which is orthodontia—for the X ray is a most valuable adjunct to the orthodontist's work. It has also been brought out that the X ray is of immense value to the operator in dealing with impacted teeth, as it shows very accurately the presence of the tooth and its position. It also reveals the presence of supernumerary teeth or of any foreign agent that may be present in the tissues, and determines beyond a doubt the absence of teeth. We

all have frequent occasion to wait for teeth to erupt, and we are continually explaining to the patients that in time the tooth will come through. We lose such cases if no tooth erupts, while we really can determine the condition in less than half an hour by referring the patient to a competent manipulator of the X-ray machine, who can readily state whether the rudiments of the tooth are present or not. In the treatment of diseases of the antrum, and in diagnosing conditions of the antrum, the X ray has another place of great value to the dentist.

Then, again, it is of value in diagnosing fractures of the jaw. I have had several cases in my own office and cases sent from other offices in different parts of this city and other cities, where the dentist has not taken the precaution to use the X ray to determine obscure fractures of the jaw. In a number of cases obscure pains were present; at first I was not able to determine the cause, but when I referred the patients to the X-ray specialist, slight fractures of the jaw have sometimes been found. The X ray is also of value in localizing the seat of the fracture and in watching the progress of the treatment. I think we are to be highly censured for obtaining bad results in a fracture if we have not used the X ray to determine that the position was correct following the setting of the fracture. The detection of necrotic areas is another point brought out by the essayist that is of great value to the dental practitioner. It has also been claimed, and I myself believe, that pulp-stones and calcareous deposits in the pulp can be detected by the X ray. If we have a patient complaining of neuralgia we may be lucky in detecting calcareous deposits around the pulp as the cause of the neuralgia, and this, I think, can be done by the X ray. Last, but not least, is the detection of the perforation of the root. There is hardly an honest dentist who would not admit that at some time he has probably perforated the root of some tooth. There are probably very few dentists who have not some time left some portion of an instrument in a root. We

must be honest about such instances, and the best means of finding out is the X ray. I had a case last year of obscure trouble in a tooth, and upon examination it was found that the root had been perforated, and some of the root-filling material had been forced through the perforation. That condition was alleviated by the light of the X ray, and the patient promptly recovered without losing the tooth.

Under the second heading, the essayist speaks in his paper of the valuable applications of the X ray in neuralgia, periodontitis, antral conditions, necrosis, etc., all of which are of decidedly great interest to the dentist.

Dr. W. S. NEWCOMET, Philadelphia. I will show on the screen a number of pictures illustrating the different conditions to be detected by the X-ray skiagraph [exhibiting].

Dr. Newcomet also showed a number of slides representing cancerous conditions about the face and mouth, the slides reproducing the colorings perfectly true to life.

Dr. G. L. S. JAMESON, Philadelphia. I should like to refer to one picture that was shown on the screen which was most interesting, and in which the results were most satisfactory. The patient had suffered for three or four years with a recurring abscess in the region of the lower left third molar. The abscess had been lanced eight different times. At first the pain was not especially severe, but each time it recurred with greater pain, and finally it was reflected into the second bicuspid. I worked on this patient for some time, but could find no cause for what appeared to be periostitis of the lower jaw. As has been my habit for a number of years, I had an X-ray picture taken to help in determining the cause of the trouble. I would say here that nothing has given me more positive satisfaction and has helped me more in diagnosing than the X ray. If every dentist would do his best for his patients, he should have X-ray pictures taken, for then he can be positive in his diagnosis. If you have a case of an impacted third molar or of an unerupted tooth, by send-

ing the patient to the X-ray specialist you will know positively whether the tooth is in proper position in the jaw or not.

Referring again to the case, the two lower molars, first and second, had been lost early in life. The X-ray picture showed the tooth, and we decided that it should be removed, and the patient was taken to the hospital. The patient had always been in good health previously to this trouble. We opened into the jaw, drilled down to the tooth, and removed it by means of a hatchet elevator. I have the specimen here in a bottle. When the tooth came out, there proved to be a suppurative dentigerous cyst; the tooth was probably an inch in length, and the cyst and all came out together. After the operation the patient suffered from neuralgia, which seemed to be located in the second bicuspid, nearest to where we had operated. The physicians thought that the neuralgia was in the second bicuspid, but I was under the impression that the trouble was in the inferior dental nerve, and would not remove the tooth. The neuralgia disappeared in the course of two weeks, and the tooth is still in proper position. Of course, where the cyst was taken out there is an opening about one-half of an inch in length. The patient is entirely relieved of neuralgia, the incision is healing from the bottom, and in due time I think we shall have a complete cure.

Dr. J. H. GASKILL, Philadelphia. In the essayist's paper and in the remarks of several of the speakers who followed, the value of the X ray in pyorrhea has been mentioned. I cannot help but question the value of the X ray in the treatment of pyorrhea. We all know that the actual cause of pyorrhea is the deposition of calcareous deposits on the root. The X ray will not remove these deposits, and unless they are removed, I fail to see its value. Feeling that it is dangerous to subject the patients to repeated treatments with this dangerous agent, I question whether it is expedient or advisable to resort to such means. I feel that it is only just to utter a word of warning

to those who are inclined to adopt this method, as its results seem to be questionable. Its value in making diagnoses is of course beyond question. The X ray and the fluoroscope are of use, and we know that in certain cases they will bring about a healthful condition of the tissues by stimulating natural growth, but not in cases of pyorrhea, which is proved to be due to irritation. Unless this irritation be removed, the X ray cannot be of any great value, and even then the continued application may result in serious damage to the patient.

Dr. PFAHLER (closing the discussion). I am very grateful for the excellent discussion given to my paper, because it is always the discussion which brings out the salient points. I am glad to know that Dr. Tousey has obtained good results in the treatment of epithelioma of the gums. I have not treated and do not care to treat with the X ray epithelioma of the gums, or elsewhere about the mouth. Dr. Newcomet has shown us some excellent colored photographs of epithelioma about the face, but not in the stage in which epithelioma should be recognized and treated. When patients come to you for dental treatment and you observe little epitheliomatous patches on the face, then is the time to advise them to have this condition treated. As to Dr. Tousey's use of the fluoroscope, I should like to call to mind the cases of ten specialists in this country who have died from the effects of the X ray, owing to the use of the fluoroscope. I should like to sound a note of warning, because the fluoroscope may tempt you, being easy to use and having the shape of a mouth-mirror; but I beg of you to look at Dr. Tousey's hand before you undertake that.

I was very much interested in the case reported by Dr. Jameson, in which there was neuralgia due to an impacted tooth. Dr. Brophy, who could not stay until the end of the session this afternoon, referred to another case in his talk last night, in which the patient had osmic acid injected into the nerve to cure neuralgia. By the use of the X ray the cause was found to be due to pressure

of a tooth on the infraorbital nerve. The tooth had wandered away from its position into the infraorbital region and had pressed on the nerve.

I do not think that any operation should be attempted without first making a definite diagnosis. The case of epithelioma that Dr. Newcomet referred to, which proved to be only a retained root, is another excellent lesson in this subject. What a shame it would have been if half the jaw had been removed in a case of suspected epithelioma where the trouble was really due to a retained root. All these things should serve as a warning.

I agree with Dr. Gaskill with regard to pyorrhea. I did not mean to give the

impression that every case of pyorrhea should be treated with the X ray. I believe that pyorrhea should first be given all the dental attention possible; but I believe that Dr. Gaskill will agree with me that many of these cases are not cured after such treatment, and in such an event, before you despair of obtaining beneficial results, try the X ray. It seems to me that these arguments are worth considering; but do not use the X ray carelessly nor use it in every case. It is not the first thing to be thought of, but probably the last after every other treatment has failed.

The meeting then adjourned until the evening session.

(To be continued.)

MARYLAND STATE DENTAL ASSOCIATION AND THE DISTRICT OF COLUMBIA DENTAL SOCIETY.

Thirteenth Annual Union Meeting, Baltimore, Md., June 4-6, 1908.

(Continued from vol. 1, page 1223.)

FRIDAY—*Morning Session.*

THE meeting was called to order Friday morning, June 5th, at 10 o'clock, by Dr. Taylor, president of the District of Columbia Dental Society.

The first order of business was the report of the Committee on Dental Education, by Dr. C. C. HARRIS, Baltimore, as follows:

REPORT OF COMMITTEE ON DENTAL EDUCATION.

I have frequently thought it a waste of time and energy on the part of our associations to discuss dental education as routine work, believing that this subject can safely be left for the schools to solve.

There was a time when the rivalry in

our colleges aimed to secure students by the claim of the least time and energy necessary for obtaining the diploma.

Today the issue is a very different one. Education has encouraged self-respect, and this in turn has brought about dental laws and state examining boards, with a result not altogether anticipated. The standard of education has advanced immensely, and the rivalry today in the colleges is to give the longest curriculum, the most complete course, the best equipment for study. The diploma must be won by hard work and a long course, hence education from a scholastic point of view cannot stand still. It must advance through a rivalry among our schools for the highest standard.

There is another and very important side to this question, which relates to our condition of life after the ground-

work of college education is over. It is to be polished gentlemen, not only in our dealings with each other but with our patrons and the world, in order that our social position may be elevated. This is a line of education that requires much thought and seems insurmountable. We must be good fellows to each other and observe the golden rule. We must aim to rank with the best of the professions, to be second to none; we must be on the same plane with medicine, law, theology, art, etc. These men hold the highest rank with the laity and this, more than the actual professional work, secures them their status as gentlemen of worth. There are many unworthy men in each class—many who disgrace their calling, but the great majority uphold a dignity and standard that command admiration.

There are many glaring conditions that seem peculiar to our profession, and while practiced by only a few, these are unfortunately given such prominence as to be most effective in producing that silent opinion: "They won't do." I allude to the extravagant methods of advertising. Our newspapers are used by only a few, yet these advertisements are of such a nature as to attract everyone's attention. Another horrible method that no man of refinement should use is the front-door showcase. I should like to see every man of our profession refuse to grant these men a speaking acquaintance. Another growing evil to our standing with the professions, and as high-class men with the better elements of society, is the commercializing of our calling, with unnecessarily large and conspicuous signs.

What man of culture, of natural or even educational refinement, can desire a sign covering the side of his house, or illuminated at night?

Our associations should regulate the sign question as a part of the ethical requirement for membership therein, also the question of practicing under fictitious names.

On visiting a dentist friend recently in New York, I found him living in an attractive block of similar looking houses.

There was no sign whatever to distinguish the house. While I would not advise this extreme, I could but admire and respect the man who was so eminent and self-respecting as to maintain this position; nor am I slow to advance the opinion that every patron is favorably impressed. The dentist's home and offices bespeak culture and refinement.

Our profession has a broad field in promoting public instruction, in teaching the cleanliness of the mouth as a matter of hygiene and sanitation, and the preservation of the teeth as promoting health and preventing disease, and affording real enjoyment in the act of eating.

Why speak of boiling each glass of water to destroy a few harmful bacteria, while a neglected and decayed tooth contains thousands? Teach our women that their mouths should receive quite as much attention as their finger-nails, with a far more salutary effect. Our greatest duty in this line of work is to enlighten the physician, to teach him that many of the stomach and intestinal troubles would have been prevented if there had been perfect mastication and cleanliness of the mouth, and explain to him that many harmful bacteria enter the system through the tonsils and fauces.

We must impress on the public that the mouth is the greatest germ-breeding pen of the human body, and that many of the contagious, infectious, or germ-producing diseases are established through germs produced and multiplied in the mouth. The medical mind and the public have never been so receptive to this teaching as they are now. Let us get busy. Dental associations might approve articles on these subjects and encourage the profession to give them to our patients. Encourage the reading of such articles in schools, churches, and societies where they will be well received.

To sum up the situation, I would say that the status of our profession as well as the success and the standing of the individual must primarily depend upon a high standard of education being required for entering a dental school. A well-educated man must readily compre-

hend dental studies, and such a man is likely to possess that pride and self-respect which elevate both himself and his profession.

The discussion of Dr. Harris's paper was postponed until a later session, and the president announced as the next order of business a paper by Dr. W. A. CAPON, Philadelphia, on "Porcelain After Eighteen Years."

[This paper was printed in the September issue of the *Cosmos*, vol. 1, p. 909.]

Discussion.

Dr. T. P. HINMAN, Atlanta, Ga. This paper is so excellent in every detail that it deserves someone more capable than I am to open the discussion.

Judging from the work that Dr. Capon has shown here, I consider that his paper marks a new era in the dental profession with regard to the use of porcelain. He has shown very conclusively that porcelain has its place, and that it has come to stay. I have noticed in attending meetings during the last year that everybody is talking and asking about silicate cements. We are going wild over this subject just as we have gone wild over the gold inlay, and over the subject of porcelain. To those who are going to work silicate cements I have just one word to say, and the reason I mention this is because the essayist has mentioned it in his paper. We cannot be too conservative in the use of any of the silicate cements, and you must perfect yourselves in the technique of their manipulation, because they are not easily worked, and if you attempt to put them in indiscriminately, you will have just as many or more failures than were you to use porcelain indiscriminately. In the use of porcelain as a filling material I have had some experience, dating back to about 1897. The essayist is a little older than I, and has had more experience, being a pioneer in that line of work. I have observed that same peculiarity in the discoloration of the cement line in certain mouths, and should like to know what causes it just as much as Dr. Capon

would. I have had several theories with regard to it. I always begin to look for a cause when I find something wrong, and that dark line caused me to start thinking. The mixing of the cement must not be done with a metal spatula, we all agree on that point. I have therefore used various spatulas, of bone, celluloid, or wood. I have thought that in all probability some of the discoloration came from the fact that small particles of the bone, celluloid, or wood became incorporated in the cement, causing it to disintegrate and discolor. I do not know whether that theory is worth anything, but that is the way it seemed to me, and therefore I have recently been mixing my cement with an agate spatula, because I think that there is no possibility of anything deleterious becoming incorporated in the cement. I had one patient for whom I had to replace six inlays on account of the discoloration, which began within a year after the inlays were inserted, the margins being fair. There was no decay, simply that peculiar discoloration around the margins. Now, just what causes that is too much for me to decide.

The conservative application of porcelain is certainly to be commended. I do not suppose that there is a man present who has not used porcelain to a greater or lesser degree. The success of the porcelain filling is due, I believe, as much to the care in the mixing of the cement as to any other feature. Last night I spoke of the use of cements in attaching gold inlays where the grain of the cement was so large that it would prevent the proper setting of the inlays. Dr. Poundstone of Chicago has made a series of experiments along that line, and has shown by actual measurement that the grains of some cements were one five-hundredth of an inch in diameter. With an inlay made with a matrix one fifteen-hundredth of an inch or one two-thousandth of an inch, whichever you use, and cemented with a cement which has a grain one five-hundredth of an inch in diameter, it is very easy to see how you get an improper setting of the inlay. Under such conditions a proper setting

is absolutely impossible, and I believe that many failures in inlays are due to the use of cements the grains of which are too large. My experience in the use of the porcelain inlay has led me year after year to be more conservative in its use. It is a very peculiar thing that of inlays inserted in different mouths under practically the same circumstances, some will last very much better than others. This to a certain extent may be due to the care with which the patient looks after his mouth, but I have found that my inlays usually last about equally as long, and as a rule give about the same results, in the same mouth. I have done very little of this work in the bicuspid and molars, believing that I could more perfectly serve my patients by the use of gold. Dr. Capon seems to have proved that he can make a porcelain inlay in a bicuspid with as much success as he can a gold filling.

Dr. CAPON. These are special cases. I do not advocate the use of porcelain in these places, particularly not in the molars, but confine myself more to the anterior teeth.

Dr. HINMAN. In these special cases the results have been very commendable. In molars and bicuspid I have been casting gold inlays, and when the wax matrix is made I take a sharp excavator, cut out the buccal surface, make a little hollow dish, and then bake in low-fusing porcelain so as to get a thin veneer of gold. I have had several such cases; the first one I treated in 1905, and it was in good condition when I saw it the last time. In some cases this method is specially indicated, as it affords the service of the gold and the cosmetic appearance of the porcelain. It is not applicable, however, in every case.

In conclusion, I wish to thank Dr. Capon for all the work he has done in advancing the cause of dentistry. There is no man that I know of who has done more conscientious work, and who has labored more to get at the very facts of porcelain and its limitations than Dr. Capon. His work has attracted my attention more than any other because of the results that he obtains. I must ad-

mit that I cannot obtain the beautiful results that Dr. Capon gets in some of his work, owing to his greater skill and application in this particular line.

Just one more word: I wish to impress upon all my hearers not to try to contour with silicate cements and expect to secure permanent results. I have experimented with silicate cements for contouring in two cases as carefully as I knew how. One of these inlays has been in the mouth now for two years, and little pieces of the cement are beginning to scale off, and the corners have also broken off. For contour work I still believe that the well-made porcelain filling is superior to any form of filling that we can avail ourselves of at the present time.

Dr. H. P. COBEY, Washington. This is a subject in which I have been exceedingly interested; not for eighteen years, however, for I have been practicing only twelve years, therefore I am hardly capable of discussing a paper on "Porcelain Fillings After Eighteen Years."

During the time I have been doing porcelain work I have made certain observations, and have come to the just conclusion, which has been very beautifully shown by Dr. Capon, that porcelain as a permanent filling material has its place in dentistry. We cannot discard it, if we would do justice to our patients. It is demanded in certain conditions, in which no other filling that we have at our disposal at the present time can take its place. The esthetic effect of course is a strong point in favor of porcelain fillings. We are able to do more beautiful work, and the most gratifying result that I have gained from Dr. Capon's paper is that we can do this beautiful work permanently. It is a great pleasure and satisfaction to have this point substantiated by one who has spent so many years in this special line of work. I should like to ask Dr. Capon what has been his experience with the durability of porcelain fillings as affected by the inequality in the wearing of the porcelain and the tooth-structure around it? Has it not been your observation, Dr. Capon, that sometimes our porcelain fillings are fail-

ures on account of this inequality in the wearing of the two substances, which leaves the filling too prominent and subjects it to too much stress?

I should like to have heard some satisfactory explanation of the black line around porcelain fillings. I too have noticed this condition, and have been unable to satisfactorily account for it. Dr. Hinman's explanation that we may have foreign substances incorporated in the mixing of the cement may be a correct one. A little later on I suppose Dr. Hinman will be able to tell us positively what the cause is.

I wish to thank Dr. Capon for the great satisfaction he has afforded me in emphasizing this one point: That we can do permanent work with porcelain, and that we can depend upon it to preserve teeth.

Dr. H. E. KELSEY, Baltimore. In the beginning of my very few remarks I should like to say that we should consider ourselves very fortunate to have the results of eighteen years of close observation and practice presented before our society. It seems to me that eighteen years of observation and practice at the hands of a man like Dr. Capon, whom we know to be an earnest and careful investigator, should be sufficient to absolutely confirm or disprove the statements made in regard to this material at the beginning of our experience with it. The essayist to my mind has convincingly proved the assertion made at that time that porcelain would supply the long-felt want in dentistry of a filling that would be permanent, that would be compatible with tooth-structure, and that would render the tooth as nearly as possible free from the liability of marginal decay, and more or less relieve us from unsightly gold fillings; in other words, a material that would reproduce the natural conditions to the extent of leaving the tooth inconspicuous to the average observer.

There were several points that occurred to me during the reading of the paper that I considered worthy of discussion; these have been touched upon by the other speakers. The first and most im-

portant one is the discoloration of the cement around the filling. I had hoped that along with the other things which Dr. Capon proved to us he would tell us that he had eliminated this undesirable feature from porcelain fillings, and I am sure that if he could not do so, I cannot. But it has occurred to me that in mouths where this discoloration is to be observed, we also find the small natural fissures in the teeth discolored. In the little buccal fissures, and even in the occlusal surfaces, a slight discoloration will nearly always be found that is difficult to remove. If, as we all know, these small natural fissures of the teeth will receive discoloration or stains, or deposits—for it probably is a deposit—why should not these slight fissures in the line between the porcelain and the tooth-structure also receive these deposits. The stain does not penetrate through the entire body of the cement, but comprises only the cement margin. The explanation which I have just given may account for this. In some instances of my very bad porcelain inlays I have been able to take an excavator and scrape out a little of the discolored cement with rather good results, and plaster in a little cement in the way Dr. Capon has mentioned. Dr. Hinman may have accounted for the discoloration by the introduction of foreign substances into the cement. As he says, any metallic substance will discolor the cement, and it may be that organic substances from the bone spatula have the same effect. In the discolored lines along porcelain fillings I have seen a deposit which has the appearance of the green tartar that we find upon the teeth of adults, and often on the teeth of children, and it has occurred to me that this may be the same kind of deposit.

The cases that Dr. Capon has shown where the whole incisal edge of the tooth was built up, furnish an excellent proof of the strength and stability of porcelain. This appears to me as a little finer work than a whole crown; it represents simply a half crown, and if a whole crown built from the gum margin is strong, a portion of a crown will also be strong, as Dr. Capon has proved. The most

striking results shown are the longitudinal corners built on the teeth, which have lasted for fifteen, seventeen, and eighteen years. In this class of work I have found it most difficult to obtain proper retention, and I am delighted to see somebody who has had uniform success in keeping the inlays in position.

I have only one thing further to say; that is: If it be proved that the porcelain inlay made in the matrix, from which it must be removed, thereby undergoing a certain diminution in size, has sufficient strength and retention to resist the stress of mastication and of other forces to which it is subjected in the front of the mouth, then, it seems to me, all arguments in regard to the gold or cast inlay are superfluous, because we all know that we can get a much firmer attachment by the use of dovetails and interlocking methods used in porcelain work. The exhibition which Dr. Capon has given seems to simplify the discussion on the gold inlays.

I feel that our society is to be congratulated that this important matter has been brought before us and conclusively proved.

Dr. S. W. BOWLES, Washington. This record of the permanence of porcelain fillings has been a matter of particular comfort to me, because I have followed Dr. Capon's method of preparation of cavities for porcelain ever since I started in this work. I am young in the work, but there is one class of cavities to which I wish to direct your attention, namely, the class of approximal cavities in the anterior teeth extending to the incisal edges. I remember very distinctly Dr. Capon's plea for long graceful curves, practically making the labial margin of the cavity one continuous curve, and I have followed this method of preparation to the letter. Dr. Capon decries the use of pins in this class of inlays, and his record showing that these corners are permanent and stable is certainly a great comfort to me. I would add to this record by stating that my failures in porcelain work have been fewer in this class of cavities than in any other. When this work was first begun, we were all afraid

of carrying the inlay to the incisal edge, but I believe that proper preparation and perfect adaptation of the inlay furnish a strong filling. I can commend to anyone the value of the method which Dr. Capon advocates for the preparation of this class of cavities.

I cannot add anything more, except perhaps a word about the cement question. I have sometimes wondered whether with our cements we do not take too much for granted, and whether we do not put too much faith in the manufacturers. It seems to me that cements are more or less like porcelain bodies—we do not find them to be always the same; and I have sometimes wondered whether we do not get a batch of cement which has perhaps foreign substances in it when it comes to us, and with all our care we are handicapped with an imperfect material. This may be another suggestion explaining the faulty cement line.

I wish to personally thank Dr. Capon for his excellent record, which to me will forever be a means of warding off all attacks on the permanence of the porcelain inlays.

Dr. C. N. JOHNSON, Chicago. I wish first to congratulate Dr. Capon very heartily on the presentation of his paper. It is of the greatest interest, being a record of practical cases, which after all counts the most for or against any particular method. There are probably very few porcelain workers who could show a similar record for the same number of years. The thought, however, always arises that we cannot form a definite opinion on the recital of a given number of successes, because we are not always able to trace the failures that we have. In the summing up of this whole question, as with every other material, it takes longer than eighteen or twenty years to form a just estimate of porcelain as a permanent material for filling teeth. Dr. Capon has demonstrated, however, that porcelain has a definite field in dentistry, and as has been intimated, if we were to remove porcelain at the present time from our armamentarium, we should be seriously handicapped in

giving our patients the proper service. I shall have a word to say along that line in my paper this evening.

The reference made to the discoloration around porcelain inlays, to that darkened line, is another point that I consider most commendable in the paper. Dr. Capon comes here with all these successes, and then acknowledges his limitations; it is the acknowledgment of a man's limitations that makes him a great man. We may recite our successes, but when we have the courage to come before the members of the profession and acknowledge our failures it is most commendable.

We have tried to account for this discoloration around porcelain fillings in different ways, and I would suggest something from another point of view. That dark line is not a discoloration of the cement at all; it only appears after the cement has been dissolved from between the inlay and the tooth, and if I were to suggest a solution of that problem, I would say that it is due to gelatin-forming micro-organisms. If it were possible to get that material out, it would I think be found that the ditches caused by the solution of the cement are filled with gelatinous plaques formed by micro-organisms in the mouth. As Dr. Kelsey said, the discoloration of the fissures is practically the same kind of discoloration, and if you take that out of the fissures of the teeth, you will see that it is simply a gelatinous formation. This discoloration is to me one of the most discouraging features in porcelain work. I can mechanically remedy the defect when a porcelain filling is broken, but when a patient comes to me with inlays marked by that dark line I feel very much discouraged. I have tried to pick it out, but have failed. I wish to commend this to Dr. Capon's consideration, and ask if he will not try to determine the character of these gelatinous masses in these interstices.

Dr. C. J. GRIEVES, Baltimore. I think that I was among the first to welcome Dr. Capon to this society, and I have always been willing to sit at his feet and learn. This is but another illustration of what

we have to learn from him about the durability of porcelain work. He has demonstrated the value of high-fusing porcelain with the platinum matrix. You must not forget the fight waged some years ago between the advocates of low and high-fusing porcelain. Dr. Capon then demonstrated the fact and has always maintained that a platinum matrix of one one-thousandth of an inch could be burnished to the thinness of one two-thousandth, or at least much thinner on the caval edges than the original matrix material, and still have the rigidity not possible in pure gold. I give him great credit for being the practical man who introduced high-fusing porcelain in this country.

I wish to say one word in regard to silicate cements. I think like Dr. Hinman that we have been going through a silicate spasm, so to speak. I have had some five or six specimens on the stand under low powers, and from what I have learned I do not pin my faith to silicate cements in any cavity. I should like to make one point here; that is, if you were to fracture a perfectly sound tooth and attach the fragment to the tooth proper with some adhesive, it would not match, because the refraction would show up the fragment in a different light and color, and impart to it a shade different from that of the bulk of the tooth. The paradoxical claim is made by the advocates of the silicate cements that these cements are adhesive and that a tooth can be matched in small or large fillings by simply mixing the shades of powder. These men also suggest that the cavity must be undercut. Now, I have my suspicions about any man who is selling a cement and claims that it clings to the tooth, and still suggests that you must have undercuts. The fillings which I have seen after they have been placed in the mouth and matched appear to have contracted, and it is my belief that the silicate cements, no matter how carefully they are worked, contract, thereby admitting saliva which produces translucency and color. Somebody has said years ago of the color problem in porcelain work, that the most perfectly

matched porcelain fillings are set with saliva, and that after they have been cemented with any not perfectly transparent adhesive we have a different effect.

Furthermore, in those instances where I have removed these cements I have rarely found them adhering to the cavity wall, for being very hard they could be split in the middle and turned out just like amalgam fillings. I simply mention these points because the subject was brought up by the paper.

Dr. H. C. THOMPSON, Washington. My experience in porcelain work has been that my only successes have come from following the essayist's teachings with regard to porcelain. If, however, I were to compare the successes and failures, I would have to speak more of failures than of successes. We are at the present time so enthusiastic over new ideas that we are apt to be optimistic; we give credit for successes, but fail to record the failures. Anyone who has followed Dr. Capon, a pioneer in this work, has more closely approached success than if he had merely followed his own personal experience, because it is not given to everyone of us to be a pioneer such as he is. The adaptation of porcelain, like all improvements, will lead to one of two things—an improvement so far as the esthetic effect is concerned or the loss of much that is absolutely necessary in manipulation.

The use of porcelain none of us can decry at this time; we have to use it, but the man who would be successful with porcelain is the man who knows where to use it. The man who tries to make porcelain cover his ignorance or his incompetence does an injury to porcelain work, to his profession, and to his patients. But the man who has sufficient discretion, sufficient judgment, and sufficient knowledge in relation to the limitations and possibilities of porcelain, bestows credit upon this or any other material successfully used in dentistry. When a man undertakes to make a cure—all it is sure to fail and to reflect upon the profession; but if a careful worker like the man who has given us the paper this morning comes forward and brings proof that by care and judgment in the

manipulation of a material he can use it with great success, he establishes for it a basis and a status in the profession.

One of the objections to porcelain lies in the fact that it injures the student in the same way as the gold inlay.

In relation to the question of the discoloration of the cement line in porcelain inlays, did it ever occur to you that, with very few exceptions, cement fillings do not discolor as fillings? Can you not recognize fractures, enamel checks, and perpendicular checks in teeth which will discolor, although there is no cement to cause the discoloration? Can you not also recall teeth of old people which have been worn down and which have discolored without any cement to cause the discoloration? As Dr. Johnson says, it is the disintegration of a material which is absorbed there, something which carbonizes there, but whether the deposit comes from micro-organisms is only speculation. I have come to the conclusion that it is not a discoloration peculiar to cement, because we have so many parallel cases of discoloration where there is no cement to discolor.

There is a reason why porcelain fillings have come to stay, and that is the result of comparison between the materials which we have had and those which we have; porcelain has come to stay because of its compatibility with the tooth-structure in regard to thermal action, to color, and to the conservation of the nerve energy of the patient and operator. Time is saved by the operator, and the patient is relieved from sitting in the chair in one position hour after hour. If we can make porcelain inlays as successfully as Dr. Capon, our failures are of no other significance than that they are failures and that we are responsible for them. As a matter of fact, in the manipulation of any material there are two sources—the incompetence and lack of knowledge and judgment of the operator, and the operator's attempt to devote the smallest amount of work and the least time for the greatest financial return.

Dr. B. HOLLY SMITH, Baltimore. I feel rather embarrassed to discuss a paper

that I have not heard, but I should like to add a word with reference to the discussion, with due apologies to the essayist for my unavoidable absence. With regard to the point raised by the essayist and taken up by Dr. Johnson as to that black line, I think that experimentation will prove that if the enamel margin be lined with Abbey's non-cohesive foil, single or double thickness No. 4, and the fold extended over the walls of the cavity, the difficulty will be obviated. It requires of course a great deal of care, and it cannot always be accomplished the first time, but our way is difficult and laborious, and you know we have to take a great deal of pains if we would achieve success; I should like to have Dr. Capon experiment with this method. I have set some inlays, lining the margin and allowing the fold to extend over to the side of the cavity, and I have never in any instance seen that black line, when the inlay was set with a thickness of Abbey's No. 4 non-cohesive gold.

In regard to the discussion of Dr. Grieves, I do not think that he should have condemned enamels and silicate cements entirely. I have seen some of these fillings made by the hands of a man in Boston and of one in Philadelphia which have been in the mouth for about seven years, and were as perfect as they were the day when they were placed in the mouth. There was no black line; there was no leakage; they were absolutely perfect. I know that these cements are very difficult of manipulation, and if they are used in such a way that the cavity be not entirely sealed, what tiro would not expect failure? I believe that these cements—I say these cements, though I have experimented with but one—I believe that Ascher's artificial enamel has to be condensed under pressure, and that the material or instrument which is in juxtaposition to the filling material must not be drawn away too rapidly. You can pull away from the edge of the cavity and deceive yourself that you have a perfect filling, but in a few days you will have that dark line, which is not the fault of the filling material.

Dr. N. A. STANLEY, New Bedford, Mass. I would like to ask Dr. Capon what he used as a matrix in his earliest work, and whether he used the artificial teeth pulverized and re-baked as a body to get the large restorations that he spoke of in the central tooth which was done in 1889. I suppose we are improving by experience. All who have done porcelain work realize that it is a very difficult problem to handle. The technique is something which a man has to work out for himself. His own mechanical ability and skill are put to test in the formation of cavities. After its practical introduction as a filling material porcelain was adopted quite universally, and falling into the hands of incompetent and over-enthusiastic operators, who thought it the ideal filling material, it had its failures in the same way as has bridge work. Yet it has its place as a permanent filling material, and there is no better proof of it than the paper which has been presented this morning by the essayist, who has done work in this line all these years and still uses porcelain successfully. By experience we naturally find where we can use it to the best advantage. I never have used it in molars to a very great extent nor in bicuspid, that is, for coronal approximal surfaces, though there are cases where it can be used to advantage in restoring molars. Today I am using less porcelain as a filling material than a few years ago, but I still use it in the restoration of anterior teeth where artistic results can be obtained with a fair degree of permanence.

My own experience with the silicate cements has not been such as to warrant their continued use in restoring broken portions of enamel; it will not stand.

With regard to the black line, I think we have all had the experience that after using our best skill in porcelain work and getting what we considered a good color, we notice after a while the dark line appearing. I think it was Dr. Head who as a method of eradicating this, suggested the use of a twenty-five per cent. solution of pyrozone with a blast of hot

air, and the refilling of the joint with cement.

Dr. C. E. ABBOTT, Franklin, Mass. I first wish to express my thanks to Dr. Capon for showing us the way in the use of porcelain. As the result of my experience in porcelain inlay work, I have found that the trouble lies in the fact that the enamel, the incisal edge in particular, chips away; that all porcelain perhaps chips away at this point, and that there is no real cure for that; yet in a few cases which I am about to describe I have found the method to give good results. In a distal or mesial canine cavity, if the porcelain be inserted in the usual manner, the incisal margin of porcelain will break away, and the adjacent enamel is still more likely to break away. I find that in such a case, just before cementing the inlay, it is a very good idea to take a disk and slightly round off the enamel and the porcelain. That makes a very slight ditch, and yet the stress from the antagonistic tooth or from food, instead of coming to bear on a sharp edge, comes to bear on this rounded surface, which will last indefinitely. I do not claim that this is applicable universally, but there are some cases where we can get much greater durability from porcelain used in that way.

Dr. CAPON (closing the discussion). I said in my paper that I wished to be among friends, because they would understand my sincerity, and would know that what I said was the truth. I should really be an ingrate if I did not fully appreciate your complimentary remarks, which contained not one word of adverse criticism. My paper and diagrams show the result of practical observations. I also made the statement that I did not go after these cases; that is, write for certain patients to come and see me. It is simply a record of the older patients who have stayed with me. I might have presented hundreds of just as interesting cases if I had hunted them up, but you know that in practice a great many patients leave you—some on account of death, others on account of change of residence—and it is a difficult thing to keep track of cases that would furnish

interesting records in later years. I have often wondered how some dentists can never take new patients, according to what patients tell me. I have as much as I can do, but I feel that if I did not take new patients, it would not be long before I would not have much to do, because of the continual change among patients.

Regarding the question of the black line, I must agree with Dr. Johnson and also with Dr. Smith. I do not think that it is a matter of manipulation, or spatulation, or stain in the cements whatever, because in all such cases, of which I have not had very many, this peculiarity seems to run through an entire family. In one of these cases, where discoloration seemed to run through the family, the stain was removed from the necks of the teeth, but inside of three months it returned. I therefore feel that it is a matter of micro-organisms or of a deposit of some kind, and that the cause does not lie in the spatulation or wrong mixing of the cement. I shall be very much pleased to watch such cases in the future. One patient that I have in mind is so extremely sensitive that I cannot replace an inlay except under protest. The teeth of his whole family are so sensitive that it is a relief to me to see these patients go, and I am sorry to see them come, on account of the strain imposed on them and on myself.

In regard to the changes of shape and appearance of the porcelain and the tooth-structure after years, attrition was mentioned in connection with the wearing of the tooth and the porcelain; herein lies the disadvantage of using porcelain on broad surfaces in molars and bicuspid. There is a force of contact which nothing will resist excepting metal, which is another strong recommendation for the gold inlay. I learned many years ago that although many patients insisted on having porcelain rather than gold, porcelain in molars was not satisfactory, because of the breaking down of the porcelain crown around the enamel edges and the difficulty in keeping the cement line up to what we call the standard. But in those cases which

I have shown, the porcelain crowns have fulfilled their purpose; they have kept the teeth from decaying, and if such were not the case, I could not keep up my reputation before you and before my students. It is because I have seen these things that I am still enthusiastic, but I have learned discretion, and I take issue with the gentleman who said that it was detrimental to the student to teach either gold or porcelain inlays. I do not know what he meant by that, unless he meant the difficulties which the student has in acquiring that particular work. I have noticed that the student who took kindly to other classes of work, and had the manipulative tendency that would guarantee success in other branches of work, was more successful with prosthetic work, but when it came to the manipulative side I can judge how he handles porcelain or takes to the technique of this work. If the student has the manipulative tendency that is positively necessary for success in this work, he generally obtains a pretty good mark in every other line of operative work.

In regard to curves in the preparation of cavities, I remember what was meant on that line. I discarded the use of staples and pins because this foreign material takes away a certain amount of space, which naturally prevents the porcelain from being a homogeneous mass. But in such cases as I have shown it was necessary to have some retention to resist the leverage. On the other hand, several cases of long contours involving the incisal edge have no other anchorage than the support of undercuts, and the preparation of the cavity. This is another thing that proves to me how far astray many writers have gone in regard to the preparation of cavities. I have not touched the technical side in my paper, but I am sometimes horrified in reading papers and discussions and seeing sketches of the way in which it is proposed to cut the natural teeth. It is true that most of these sketches are made after plaster models, but I feel it is absurd to recommend such preparation of cavities in the natural teeth, because my years of experience prove that that

is not necessary. This is what I meant by saying that it was not right to ask a beginner to make certain points of anchorage. There are only a few points required for success in this work, and they can be easily learned.

With regard to the matrix, I always use a platinum matrix of one one-thousandth of an inch. I have tried all kinds, but I find that to be the proper thickness. In the early days when there was no choice of porcelain, when Close's body, in which the various shades were gained by the variations of the heat, was the only thing we could use, we were necessarily very much handicapped, but it is astonishing what results have come from these old-time porcelains and from the crude appliances used at that period.

With regard to etching and undercuts, I use both, but I must say that the vast majority of my work is done by means of undercuts, because these are quickly made, and I have not had any reason for changing my views in regard to them. If you have of course a little thin piece of porcelain, the etching method must be used; in such a case I use hydrofluoric acid, but not very often.

In my paper I told you of my successes, but I am never ashamed to say that I have failures. I am only ashamed to confess my failures before a body of students, because they hardly know what constitutes failure or success. If we mention failure to a student he thinks that a man who has any failures at all is not much of a dentist. But in an assembly of older practitioners I feel more at home, because I know that they can sympathize with me. They know a man is not always in first-class condition to do a first-class piece of work. I have been probably over-enthusiastic, but not always. Time has brought about quite a change. Still I have this to say, that I have yet to have a patient come to me and ask me to take out a porcelain inlay and put in gold; and after all, gentlemen, that is what we are after, the confidence of the patients that we can save their teeth and do it acceptably to all needs.

In regard to silicate cements, I have

not spoken of them unadvisedly, because I was one of the first in this country to use them. The first silicate cement came to this country in November of 1904, and I obtained some of the first samples. Being enthusiastic on the porcelain line, I was of course willing to try this cement, and I used it with porcelain inlays to a certain extent and kept a strict account of them, and in every case, as far as I can find out, the tenacity—or rather the non-tenacity—of the cement caused failure in three months. It was the most adhesive material when first used, but I found in every case that in a short time the tenacity, on which we depend to a great extent for holding porcelain inlays in place, was gone. I was careful to use the silicate cement only in patients who believed in me, and who were willing to have me replace the inlays with oxyphosphate cements. I have spoken of the silicate cements in a rather sarcastic way, because I have been made the butt for a lot of commercial men. Just as soon as it came to my hands these men commenced to send the word out broadcast that I was using the silicate cement and was not practicing porcelain work any more. I have never gone to such extremes, although, as I said, it was reported that I bought this material in

fifty-dollar lots. The sum total of my purchases in that line has been twenty-five dollars, because as time went on I found that in certain cases the silicate cement had its place. I am using it to some extent, and I feel that after it has been properly improved it will reach its proper position in our work. I have done some experimenting with the silicate cements, and as Dr. Smith says, if you wish to have success with this material you have to use pressure, and not touch it with steel instruments; to avoid this, I have spent considerable money for a set of iridio-platinum instruments with which I can get the necessary pressure.

In our modern practice of dentistry we have porcelain, which has some little reputation for large work and which is used where the shading is important. Then we have gold inlays for teeth that are farther back in the mouth, and all the rest of the filling materials to choose from. Therefore, as I said in my paper, the dentist of today should glory in the fact that he can practice dentistry more easily than it could be done before, and the future practice will be almost mystifying, because of the new and easy methods which will be developed in the dentistry of the future.

(To be continued.)

THE DENTAL COSMOS

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Devoted to the Interests of the Profession.

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PHILADELPHIA, FEBRUARY 1909.

EDITORIAL DEPARTMENT.

A NOTEWORTHY OCCASION.

DURING the week beginning the 17th of last month there was held in Boston, Mass., what was aptly termed the Massachusetts State Conference on Oral and Dental Hygiene, under the auspices of the Dental Hygiene Council of Massachusetts, South End House, Twentieth Century Club, Monday Evening Club, and the Dental Societies of Massachusetts. The purposes of the conference were "to bring the importance of dental hygiene fully and frankly to parents, educators, social workers, and philanthropists; to invite the public to an open discussion on dental hygiene; to determine how best to further the popular movement for better care of the mouth and teeth."

The program provided meetings for each day throughout the week, and was so elaborate and comprehensive in character as to call for special notice and consideration. Papers and addresses were presented as follows:

(1) "The Layman's Part in the Crusade for Dental Hygiene." WM. H. ALLEN, Ph.D., Sec'y Bureau of Municipal Research, New York.

(2) "The Dentist's Part in the Call to Public Health." J. MORGAN HOWE, M.D., New York, N. Y.

(3) "What the Smaller Cities Can Do in Dental Hygiene." WM. W. MARVEL, D.M.D., Fall River, Mass.

(4) "The Value of Dental Examination to School Children." Miss MARY MCSKIMMON, Pierce School, Brookline, Mass.

(5) "The Importance of Dental Hygiene in the Factory and the Home." Miss MARTHA H. STARK, Sup't Instructive District Nursing Association, Boston.

(6) "What the Boston Children's Friend Society is Doing for the Dental Care of Children." SEYMOUR H. STONE, Gen. Sec'y, Boston.

(7) "Dental Caries: Its Cause and Prevention." WM. H. POTTER, D.M.D., Presd't Dental Hygiene Council of Massachusetts.

(8) "Dietetic Righteousness Comprises Mental and Dental Care." Mr. HORACE FLETCHER, Venice, Italy.

(9) "Proper Care of the Mouth and Teeth: What it Means." SAMUEL A. HOPKINS, M.D., D.D.S., Boston.

(10) "The Application of Dental Hygiene to the School System." DAVID D. SCANNELL, M.D., Member Boston School Board.

Discussion by H. W. GIBSON, Sec'y Boys' Work, State Y.M.C.A.; Rev. THOMAS I. GASSON, Presd't Boston College.

(11) "The Physiological Importance of Mastication." WALTER B. CANNON, M.D., Prof. Physiology, Harvard Medical School.

(12) "Dangers Lurking in School Drinking Cups." ALVIN DAVISON, Prof. Biology, Lafayette College, Easton, Pa.

Discussion by TIMOTHY LEARY, M.D., Prof. Pathology, Tufts Medical and Dental School.

(13) Addresses by—

GEO. S. C. BADGER, M.D., Editor "School Hygiene."

EUGENE H. SMITH, D.M.D., Dean, Harvard Dental School.

Mr. GEO. H. MARTIN, Sec'y Massachusetts State Board of Education.

CHAS. W. ELIOT, LL.D., Presd't Harvard University.

The Lieutenant-governor of Massachusetts delivered the address of welcome, and those who presided at the several daily conferences were Dr. Eugene H. Smith, dean of Harvard Dental School; Jeffrey R. Brackett, Ph.D., of the Massachusetts State Board of Charity; H. Lincoln Chase, M.D., physician to the Brookline Board of Health; Joseph Lee, member of the Boston School Board; Robert A. Woods, South End House, Boston; Samuel H. Durgin, M.D., chairman of the Boston Board of Health; Prof. Wm. T. Sedgewick, of the Massachusetts Institute of Technology.

Certainly no such notable gathering of special workers in co-related fields has ever before been brought together in the

United States, and probably in the world, for the purpose of concentrating expert attention upon the problem of dental hygiene in relation to the public health; and when it is considered that an entire week was devoted to the study and discussion of the problem in its practical phases as well as its scientific bearings, we think it will be generally and frankly conceded that those who have brought this movement to such a successful consummation are deserving of unstinted praise for their untiring and unselfish efforts. They have earned more than the personal applause and gratitude of their professional colleagues, for they have added another civic honor to their municipality and commonwealth. We doubt whether, apart from the energy and enthusiasm of the promoters in this instance, any city in the Union other than Boston could have furnished just the set of circumstances and conditions necessary to the successful launching of such an enterprise. Considering the character of the program and the public activities represented by those who contributed to it, the occasion is without any parallel in our knowledge.

Two deductions are self-evident in connection with the conference: First, it can no longer be said that dentistry is lacking in recognition as a factor of public health; and, second, it is certain that the findings and conclusions, together with the recommendations which will issue as the result of the deliberations of the conference, will have a weight of authority and a dignified importance which will do more than anything that has been heretofore attempted to bring the benefits of dental service into effective relation to the needs of public school children in this country.

We in America have permitted this important work to remain practically undone, while several European countries have for years been giving active attention to it. The cause of this tardy recognition of a clear duty has, as we view it, been due to a lack of initiative rather than a lack of energy or of enthusiasm in connection with dental service for our school children. All over the Union the subject has been agitated, and various sporadic attempts have been made to accomplish something in a practical way by voluntary effort, but no attempt seems to have been made to aggressively force the problem upon the attention of those who are generally responsible for the administration of

our educational work or of those who supervise the health conditions of the school children who are receiving their education at public expense. We have needed the initiative to make the attack in those directions, and we have needed the stimulus of success in making the attack to rouse us up to an appreciation of what can be accomplished. The Dental Hygiene Council of Massachusetts has furnished the demonstration and the stimulus in this unique conference which it has organized, and which now furnishes a precedent for the development of an indefinite number of activities in all other directions and localities as the outgrowth of this initial movement.

It is well to note in this connection something of the experience of other countries in the practical furtherance of dental hygiene in public school service. It is generally the case that in its initial stages the work has been taken up voluntarily by groups of dental practitioners without state or municipal aid at the outset, for the reason that in the majority of instances it was necessary to convince the authorities of the necessity for such service as a health measure. Where the work has been wholly dependent upon private voluntary effort it has tended to languish, and the only safeguard against such a tendency is that the service shall be placed under state or municipal aid and supervision. Hence it seems best both for the efficiency and the continuity of the service that as soon as possible it should be placed under the administration of health boards or their equivalent in connection with boards of public education. The warrant for such a course has been clearly and concisely expressed by W. T. Elliott, D.D.S., L.D.S., in a paper read before the School Dentists' Society of London, December 9, 1907, in which the author said: "This is one of those social problems which may be dealt with in two ways—either by philanthropy, or by the state acting through local authorities. Voluntary effort cannot adequately deal with the problem—its solution must be undertaken by the state. The child's health—mental and physical—is a national asset which it is the duty of the state to preserve and foster."

The time is fully ripe for a general effort to do in all localities what has been so auspiciously begun in Boston. From many parts of the world and throughout the United States have come the evidences of a ripened interest in the problem of the dental

hygiene of public school children. When the school board of one of our large cities finds no difficulty in securing from its city councils an appropriation wherewith to buy spectacles to enable public school children with defective vision to study their lessons, surely there should be no greater difficulty in securing civic administrative co-operation in the effort to enable these same public school children to properly masticate their food, not to speak of the prophylactic and remedial measures which too large a proportion of them fail to get for the prevention and relief of disabilities originating wholly within the oral cavity. We sincerely hope that the records of the Boston Conference may be quickly made available for the guidance and effective prosecution of a general crusade in favor of public school dental hygiene throughout our whole country.

BIBLIOGRAPHICAL.

A MANUAL OF CONVERSATION FOR THE DENTAL PROFESSION. A Collection of Professional Terms and Phrases in German, English, French, and Italian. By Dr. PAUL DE TERRA, Surgeon-Dentist, Zurich. Stuttgart: Ferdinand Enke, 1908.

The ever-growing international intercourse increases in most of the large cities and watering-places the demand made upon the dentist for a knowledge of foreign languages. Medical men are provided with various foreign dictionaries and manuals of conversation in German, English, and French. For the dental surgeon, however, there is not in the whole of domestic and foreign literature a book which can be called upon as an aid to the practitioner in his intercourse with patients, assistants, and

others, when he has need of this or that technical expression or phrase in one of the four languages. The medical dictionaries contain hardly anything of importance for the specialty of the dentist. Add to this the necessity of every scientific and up-to-date dentist becoming as quickly as possible acquainted with the latest theories advanced, the methods designed, and the treatments suggested in the dental literature of foreign countries, which are generally very briefly and often incorrectly reviewed in the dental journals of his own country, the author is justified in believing that he has supplied a real want and at the same time has filled a gap in dental literature.

The pages of the book are arranged in four columns, allowing of a rapid survey of the dental terms and expressions as used in the four languages treated; also

a table of contents and an alphabetical index which prove very useful are included. The book is divided into two parts, the first of which deals with physical, anatomical, pathological, and surgical terms, medicaments, and the terminology of operative and technical dentistry. The second part covers expressions and conversations relating, for example, to the examination of the mouth, to toothache, to caries, filling materials, dental extraction, general and local anesthesia, and prosthetic dentistry in all its branches.

In a first undertaking of this kind it is not surprising that quite a number of mistakes should have crept in, but most of these might have been avoided by having some *confrères* practicing in the re-

spective countries look over the manuscript. Frequently the genius of the language is offended—especially in the English portion. We can hardly recommend such boarding-house English as, “You will scarcely feel nothing.” “A sole application of arsenious acid” lies outside of the dental field, and the following request addressed to a woman before applying an anesthetic might lead to legal complications: “Undress yourself, please.” “Please take off your clothing.” It is desirable that in the second edition such mistakes and absurdities as now disfigure the book be eliminated, so that it may correctly fulfil its intended excellent service to readers of foreign dental literature, investigators, and writers.

REVIEW OF CURRENT DENTAL LITERATURE.

[*Berliner Zahnärztliche Halbmonatsschrift*,
Berlin, September–October 1908.]

HALLUCINATIONS DURING THE APPLICATION OF LOCAL ANESTHETICS. By
DR. PAUL RITTER.

In recent years the law courts in Germany and America have repeatedly tried cases of alleged misconduct of dentists which, it was charged, had occurred during total anesthesia with chloroform, ethyl bromid, etc., or during local anesthesia with ethyl chlorid, cocain, or cocain mixture. Leaving aside the detail of the cases cited by the author, we shall briefly review the practical conclusions which these cases suggest to the general practitioner of dentistry.

Experience in administering anesthetics teaches that often the patient for some time after regaining consciousness from total anesthesia is still under the influence of the anesthetic, and consequently in many cases

is unable to distinguish between actual occurrences and dreams. It is therefore advisable for the dentist in any case of total anesthesia to have a medical assistant or at least a reliable witness present. But even for the application of local anesthetics, especially in the case of female patients, it seems desirable to have a witness, as many cases of charges of alleged misconduct would warrant. The inhalation of ethyl chlorid, even during local application, may produce hallucinations which must be attributed to the patient's fear and pain, and to the toxic effect of the local anesthetic. Although the narcosis is not general, a slow anemia of the brain takes place.

It is unwise to speak of the harmlessness of the modern anesthetics that contain ever so small quantities of cocain, for even from a weak injection, effects upon the entire organism, especially the central nervous system, must be expected. The author cites two cases

from his own practice in which two ladies of high social standing exhibited disturbances of the functions of the brain and erotic manifestations. Cases of enuresis have been observed exclusively in female patients, the patients being unconscious of the occurrence. Besides the toxic effects of the local anesthetic, the external circumstances under which the extraction is performed in the dental practice are conducive to erotic excitement on the part of the patient. The dental chair, and the horizontal position into which the patient sometimes must be brought, the close contact of the operator with the face and bosom of the patient, the resting of the patient's head in the operator's arm, the great fear of pain, and the appreciation of words of encouragement, are all contributing factors.

Thiesing in his book on "Local Anesthesia and its Application in Dental Practice," Leipzig, 1902, describes the effects of cocaine as follows: "Increased reflexes, immense acceleration of respiration and of cardiac activity, incessant and irregular contractions of the muscles, prove that all nervous centers, the corpora quadrigemina, the cerebellum, the medulla oblongata, and the spinal cord are affected. After the stage of increased reflexes a diminution of the reflex activity occurs. The cramps observed are caused by vasomotor spasms and by anemia of the cortex." Even after an injection of eight drops of his cocaine solution (cocaine 0.08) into the gingivæ, Witzel observed sexual excitation five minutes after the extraction of a tooth. The modern cocaine mixtures, which generally contain a certain portion of adrenalin, are no less productive of such excitation than pure cocaine. The author, also Drs. Dorn and Lewin, have found that the after-effect of these solutions does not depend upon the quantity of the dose injected, but that even minimal doses will produce toxic phenomena. Erotic conditions in women may even occur without any apparent disturbance of consciousness, and in a number of such cases the patients, although they seemed in full possession of their senses and intelligently answered questions, afterward spoke of having had dreams. It also seems a peculiarity of cocaine anesthesia that the patients do not prefer charges directly, but after the completion of the operation, in some cases not un-

til they have spoken with other persons. These hallucinations assume in the patient's memory the nature of absolute certainty, and the charges are therefore preferred *bona fide*. Especially if during local anesthesia with a cocaine solution collapse or nausea or some other abnormal condition such as shock occurs which render necessary a loosening of the patient's clothes, artificial respiration, or massage of the heart, the patient's brain, especially if she be of hysteric disposition, may easily be induced to concoct criminal allegations. Dr. Hahn of Breslau, therefore, in the *Deutsche Zahnärztliche Wochenschrift*, vol. xi, No. 26, p. 548, demands for all cases of anesthesia the presence of a third person. This Dr. Ritter does not consider to be always possible nor necessary, because it would render medical and dental practice without the presence of a third person absolutely impossible, and would gravely shake the patient's faith in the profession. In this view he is most emphatically supported in an article on "The Third Person," by Dr. Erich Lazarus of Berlin, in *Zahnärztliche Rundschau*, Berlin, August 30, 1908, who very appropriately pronounces as the dentist's maxim: "Do right and fear no one."

[*La Revue de Stomatologie*, Paris, October 1908.]

RESECTION OF THE APEX. BY DR. G. BÉAL.

Resection of the apex consists in amputating, *in situ* and without extracting the tooth, the extremity of the tooth-root, an infected and necrosed apex being considered to involve the neighboring tissues in the infection and irritation. All alveolar infections, whether of pulpal origin or through the dental ligament, all root-cysts, which are nothing else than the result of inflammatory neoformations of infectious origin, have almost invariably their maximum intensity at the level of the apex. If the septic products that accumulate around the end of the root are not quickly eliminated either through the root-canal or by way of an opening in the alveolus, the neighboring portion of dental ligament is infected, necrosed, and detached from the apex, which forthwith loses its vitality. In other cases traumatism may provoke necrosis of the apex by a breaking of the fibers of the dental ligament. In any

case such a necrosed apex plays the rôle of a foreign body of which the organism tries to free itself. The removal of the apex is therefore indicated as the most expedient means of cure, provided that the apical necrosis has been properly diagnosed. Two methods may be applied in the resection of the apex; either the tooth is replanted after the amputation of the necrosed part of the root, or the necrosed part is removed *in situ*. In a given case that method is preferable which guarantees the best means of fixation of the tooth after the operation. Resection of the apex *in situ* has been described in 1881 by Claude Martin in France, and since then Rhein and Partsch in Germany, Guilford in England, Weisser in Vienna, and Frey in France have made successful operations; yet the profession at large has not embraced this method in general practice, although no special instruments are required except perhaps a trephine of 5 to 6 millimeters diameter with a central bur.

As to the indications for the resection of the apex *in situ*, the author suggests the following: The first thing is to make sure whether the root-canal is permeable. If not, the tooth must be opened up, and if necessary the canal must be enlarged with reamers. The root is then disinfected and the canal filled. An expedient means of disinfection is a solution of sulfuric acid of fifty per cent. While the canal is still open, a drop of a 1:1000 solution of adrenalin may be forced through it into the alveolus, in order to secure a bloodless field of operation for the scraping of the alveolus. For the root-canal filling gutta-percha is preferable to cement, as there is no danger of forcing it through the apex. As the second step the mucosa is anesthetized with stovain, whose action is more certain in inflamed tissue than that of cocaine. The incision into the mucosa is made with a bistoury, not with the thermo-cautery, as recommended by Valérien Pietkiewicz, and given a circular or elliptic shape from the apex to the middle of the root. Generally the bistoury pierces the mucosa and the alveolar process together, as the latter has been considerably softened. If the process is not destroyed, it may be opened up with a hollow chisel and mallet or with a crown trephine. The apical resection proper is not executed with a trephine, because, especially

in the maxilla, it is difficult in spite of the bur guide to hold the trephine in a position which does not endanger the neighboring processes, nor with an enamel chisel and mallet, because one misdirected blow may produce a multiple fracture of the root, but the work is done with a round fissure bur. As to the extent to which the necrosed part is to be removed, the replantation offers the advantage of an unmistakable judgment about the field of the lesions, while in the resection *in situ* the size of the part to be removed must be judged empirically by the zone of softened process or the denudation of the root. After the morbid portion of the root is amputated, the walls of the cavity produced by the abscess are scraped either with a fine curette or with a round bur. During the operation the wound is frequently washed by the operator, or preferably by an assistant, with hydrogen dioxide of 3 to 1 parts, or with a 1:1000 solution of formol.

In cases of long-established osteomyelitis with greatly altered tissue, the author packs the wound for two days with pulverized salol, which revives the vitality of the tissues. If this is unnecessary, and in every case after the second day, the cavity is filled with zinc peroxid. The sequelæ of the operation are very simple, there being no consequent pain or suppuration, and cicatrization being completed after about thirty days. Resection of the apex, which is practicable in any tooth, is especially indicated in the anterior teeth. It is not claimed that it should entirely take the place of dental replantation, the latter method being indicated in cases of obstructed root-canals, but it seems to have been unduly neglected in dental practice. The renewed interest which is being taken in this operation is evidenced by the two articles reviewed below.

[*Deutsche Monatsschrift für Zahnheilkunde*,
Berlin, August 1908.]

SURGICAL CONSERVATIVE TREATMENT OF THE ROOT. BY ZAHNARZT KERSTING, M.D., AACHEN.

Although during the last few years the medicinal treatment of gangrenous roots has been greatly improved by the introduction of trichresol formalin, its effect is not infallible if the producing agents of the inflammation

have passed through the apical foramen, and have produced granulating or cystic growths or suppurating absorption of the periodontal membrane and its environment. Only if there is a fistula, a cure can with some certainty be prognosticated, since the products of the inflammation and the medicaments introduced can find their exit through the fistula. Nature has thus shown us the safe and natural method for surgical treatment. By an incision, chiseling, or burring, the periapical focus of the inflammation is laid open, and all morbid parts are removed with the sharp spoon or with burs. This operation was first called apical resection by Partsch of Breslau, also maxillotomy. Euler, whom our author follows, proposes the term surgical treatment of the root (cf. *Deutsche Zahnärztliche Wochenschrift*, No. 3, 1908). Adolf Witzel, too, after first emphasizing the dangers connected with apical resection, during the last years of his life advocated this surgical method. Our author bases his statements on his experience of ten years. His method of operating differs but little from that of Dr. Béal, except that he uses cement in filling the root-canal, and, in order to render the finding of the apex of the root more easy, passes a thin aluminum-bronze wire through the apical foramen and leaves it in the cement. In the after-treatment Dr. Kersting uses neither tamponade nor suture, which only delay the process of healing.

Of the causes which may render apical resection advisable, one is of typical traumatic origin. In four cases entirely sound lower incisors become loose for no apparent reason, and a painful swelling of the chin in the region of the apical foramen was noted. The author diagnosed inflammation of the mandibular bone caused by spontaneous, violent biting during sleep. Extraction was prevented by resection and filling of the root. Another not very frequent indication for the surgical treatment are cysts or swellings in the proximity of the apices of roots, which have to be operated upon. In such operations the vitality of the pulp may be destroyed, thereby preventing the healing of the wound, or the apices of the teeth may protrude into the cysts, thereby rendering operation impossible. In one case the author resected the apices of four teeth—lateral, canine, and first and second bicuspid—which

protruded into a cyst; at the same time he corrected the lingual maldirection of these teeth. Without this surgical interference the patient would have lost the four teeth together with the cyst, and thereby the alveolar process, which would have forced him to wear an obturator for the rest of his life. Similar treatment of the apices is indicated in luetic necrosis of the maxillary bone. Maxillary fractures may also necessitate apical resection, either if a tooth is fractured near the root, or if a maxillary fracture runs across a root, the root preventing the adaptation of the lines of fracture and the progress of healing. The author closes with a plea for apical resection, which will save many teeth that are otherwise doomed to extraction, and he pleads with the surgeon to confer with the dentist in all cases where the preservation of the teeth is endangered.

[*Deutsche Monatsschrift für Zahnheilkunde*,
Berlin, December 1908.]

THE PROBLEM OF THE ROOT-GRANULOMATA AND CYSTS. BY FR. KEHR, M.D., STETTIN.

After the extraction, especially of teeth affected with periodontitis, frequently small cysts appear lying in or beside the axis of the root. After the fundamental studies of Partsch we have to consider these inflammatory neoformations as a sort of regularly recurring phenomena of reaction, such as every loss of epithelium in any part of the surface of the body produces. Every periodontitis, whether caused by gangrenous root-canals or by too high fillings or incorrectly constructed regulating appliances, is accompanied by a greater or smaller loss of epithelium at the apical foramen. During the generally long duration of the process of inflammation, the alveolar tissue makes way for all sorts of bacteria. Grawitz has recently advanced the theory that cysts are to be regarded as the final product of a purulent abscess in the granuloma. This theory stands in opposition to the opinion of Partsch, Römer, and Malassez, who regard so-called paradental epithelial remnants as the cause of granulomata and cysts. According to Perthes, even in the smallest and still perfectly solid granulomata, epithelial fibers and remnants are found. Moreover, in the small-

est cyst a serous but never a purulent fluid is always present. The eruption of the cyst rarely occurs outward, so that the fistula formed is always of secondary nature. If a fistula exists it may be temporarily clogged up, but no accumulation of fluid will take place, as in the cyst. The breaking through of the bony structure, upon which Grawitz bases his theory, occurs as frequently if not more so in ordinary periodontitis with granulomata or cysts. Typical of these cases of breaking through of the osseous structure is the formation of proliferous bone, while in cysts owing to pressure necrosis a completely smooth wall of the osseous environment is characteristic. Only in very rare cases does the granuloma persist in its original stage of solid configuration; generally it lapses into cystic or hydropic degeneration.

Between the apical foramen and the granuloma almost always a fine, capillary fissure is found, from which the discharge of serous fluid issues. The accumulation of fluid, growing under the influence of bacterial irritation, slowly softens the interior of the granuloma, and, together with the necrosis of the epithelial cells, the neoformation gains in circumference. The mass of leucocytes which are observed under the microscope justify us in considering the granuloma as a sort of protective organ, which owing to its physiological power of resistance absorbs all toxic fluids from its environment, which it tries to protect against any new infection. As long as the protective force is sufficiently strong no special symptoms are noticed; only the disfigurement prompts the patient to consult the doctor. Sometimes an acute eruption is produced by trauma, cold, chemical influences, or excessive use of alcohol and the resulting change in the systemic tone. If extraction stops the process, the cyst must have been totally removed together with the tooth. If the lingering process continues, the cyst is still present. The gradually accumulating fluid expands the cavity, until by pressure necrosis of the maxillary bone the latter is slowly perforated. One lamella after the other is absorbed, and the parchment-like crepitation, as first observed by Dupuytren—Dupuytren's eggshell symptom—can be noted upon palpation. This also explains the depression at the spot of the cyst wall lying nearest to the necrotic edges of the bone.

When the finger palpates the sharp edges, an unmistakable symptom for the diagnosis of the cyst is obtained. If, however, we meet with strongly elastic fluctuation of the circumscribed portion of the maxillary bone, then the cyst has already broken through the bone, which accounts for the bulging out of the mucosa. The cyst as it extends seeks the point of least resistance, which is the region of the roots of the teeth, and may produce a maldirection of the neighboring tooth or teeth, which then forms another important symptom. If these symptoms are not yet sufficient, probing and an X-ray picture will reveal the extent of the cyst. If the Pravaz syringe brings forth an amber-colored serous fluid, in which typical cholesterol crystals are suspended, then, even without the above stigmata, cyst can be safely diagnosed. If the cyst lies in proximity to the upper incisors careless puncturing may bring to light a mucous admixture from the nose. If the formation of a cyst is suspected in the region of the second bicuspid or molars, according to Kunert the diagnosis is negative if the syringe produces a viscous mucous fluid, which is always due to empyema of the antrum of Highmore. The cyst may of course also penetrate the thin osseous partition and fill the antrum. Glandular swelling may be added to the list of symptoms, although this is more characteristic for periodontitis than for cyst. If a cyst assumes the state of virulence, the vascular alterations lead to degeneration of the tissues into a whitish-yellow mass, in which infinitesimal drops are suspended in great quantity. Such adipose degeneration is strictly proved by its turning black under perosmic acid. The suppuration following this degeneration is accompanied by grave symptoms of inflammation and severe pains in the maxillary region, by edema of the soft parts, and high fever. Kunert also reports unilateral pain in the head and the eyes, optic ciliary movements, and nervous symptoms resembling migraine. In almost all cases of suppuration a secondary fistula may be found, due to either spontaneous perforation or to trauma.

In every case the prognosis is a favorable one. The therapy always consists in surgical interference. If the granuloma is still small, extraction in most cases will suffice, if the neoformation is totally removed together with

the tooth. The conservative treatment, which at all events tries to preserve the tooth, consists in resection of the apex and removal of the cyst. The acid treatment as suggested by Witzel is insufficient, since acids alone will not effect the total retraction of the neoformations. The indispensable treatment of the root is facilitated by the fact that according to Witzel's statistics of 105 cases 76 were located in the maxilla, 29 in the mandible, the incisors and bicusps largely out-

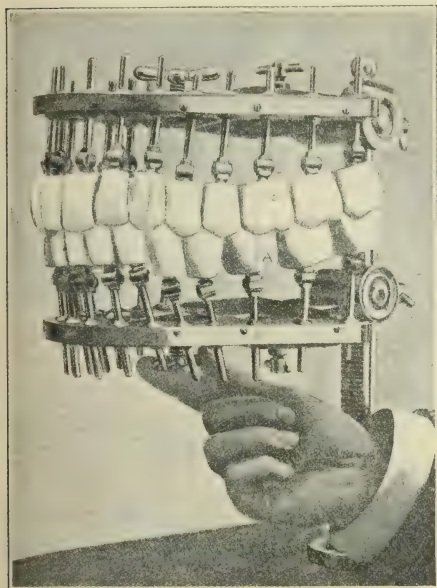
time to grow into the cystic cavity. In 230 cases of this implantation of the mucosa, no relapses have been observed.

[*La Odontología*, Madrid, July and December 1908.]

THE TERADONTOGRAPH. BY M. SUBIRANA, MADRID.

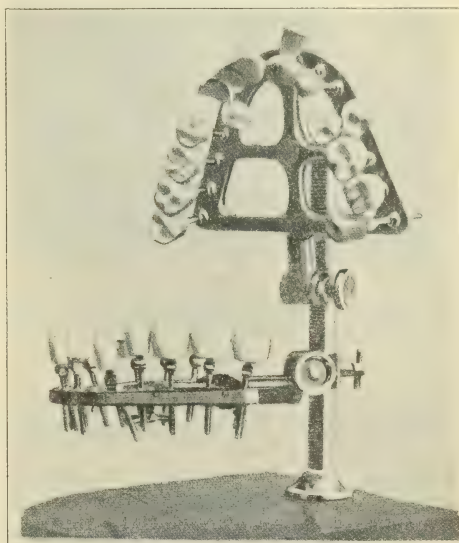
The apparatus designed by the author is intended to demonstrate all anomalies of den-

FIG. 1.



The teradontograph in normal occlusion. By means of screws the 16 teeth in the upper and lower arches can be tightened or loosened.

FIG. 2.



The maxilla raised as seen from the left. The mandible as seen from the right. Several teeth are shown in malposition.

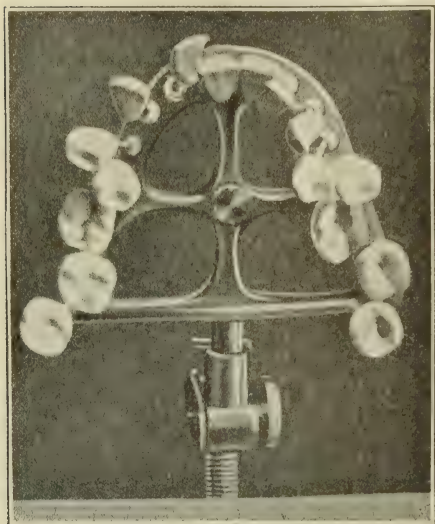
numbering the molars. Resection of the apex is indicated in still solid and generally small cysts. In more advanced cases the cyst operation after the apical resection must be instituted, consisting in complete extirpation of the cyst and healing in the flap of mucosa. The formation of epithelium in the cyst is the same as that in the normal mucosa. Upon this identity, Partsch bases his method of transforming the cystic cavity into a side recess of the oral cavity. The borders of the wound are prevented from growing together by tamponing with strips of iodoform gauze, which afford the oral epithelium sufficient

tal occlusion and the various methods of correcting the same, and seems particularly appropriate in countries which are so far not fortunate enough to enjoy museums where all anomalies and their corrections are kept on record by original casts and photographs. Nor has every dentist had the opportunity or the time to make for himself a collection such as is highly desirable. Every writer on orthodontia has felt the imperfection of his articles due to the limited space available for illustrations. This apparatus, then, is intended to not only reproduce the seven anomalies of the individual teeth, but also the anomalies

of occlusion and the successive stages of their treatment. The teeth, which are mounted on

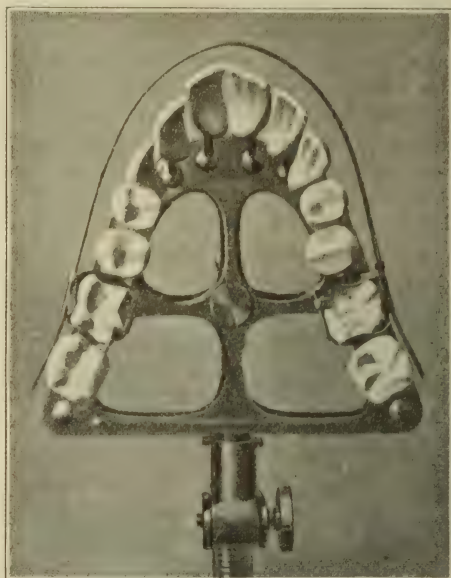
or lowered. The great advantage of this apparatus for demonstrations in dental schools,

FIG. 3.



Maxilla showing strange deviations of the teeth.

FIG. 4.

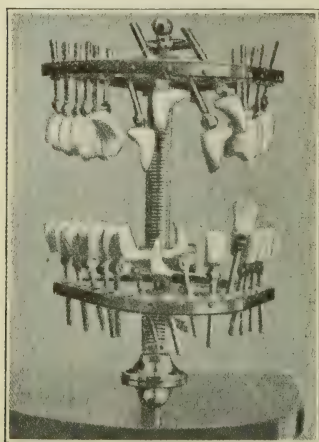


V-shaped upper arch. Angle's apparatus in place.

movable pivots, may be given any desired inclination. The two pieces corresponding to

lectures, and meetings may be perceived from the subjoined illustrations.

FIG. 5.



Mandible lowered, the incisors in both arches showing complex deviations.

the upper and lower jaws are fastened to clamp screws by which they can be raised

[*La Odontología*, Madrid, November 1908.]

RESECTION OF THE MAXILLÆ. BY DR. D. JOSÉ RIBERA SANS.

While believing ligatures to be necessary in resections of the tongue, the author disapproves of ligating the carotid artery in resections of the maxillæ. By carefully following Creus' simple and easy method it is practically impossible to injure the carotid. In forty-one resections of the mandible, most of which comprised the symphysis menti, no accidents due to the omission to previously establish hemostasis were met with. Only one case of total resection for diffuse osteomyelitis with subsequent necrosis terminated fatally, the patient in question being a female infant of twenty-one months, affected with galloping consumption. All other cases, with the exception of one, which suffered a relapse, were satisfactorily cured without the slightest accident. After formerly having employed local anesthesia, the author now advocates

total anesthesia. He never establishes pre-operative ischemia or uses tracheotomy, being firmly convinced that the hitherto advocated and complicated methods are simply the result of preconceived notions, especially of fear of hemorrhage.

The resection of the maxilla, although appearing to be more dangerous, in reality is not so. The hemostasis of the bloodvessels of the internal cutaneous membranes is very simple; the great majority of bloodvessels opened during the operation need not be ligated, as they close up during the process of suture; the only vessels to be ligated are those belonging to the branch of the internal maxillary artery. If it were true that on removing the bone this artery is always injured, the operation would indeed be dangerous; yet hemorrhage can be prevented by a tampon of gauze. In a large number of cases of resection of the maxilla, most of which were total resections, only one death occurred, owing to hemorrhage from a nasopharyngeal polypus.

The danger of hemorrhage in such polypus lies not in the removal of the bone but in the severance of the connection of the tumor with the basilar apophysis. Out of five such cases four were successfully operated upon; one terminated fatally owing to hemorrhage during the operation. According to the nature of such hemorrhage nothing can be done if it assumes fulminant proportions. Previous hemostasis, which would demand ligating the two primitive carotid arteries, is not indicated, since in the majority of cases no accident is to be expected, and it would be unwise to expose the patient to quite imminent danger. Naso-pharyngeal polypus must not be confounded with myxoma of the nasal fossæ. In all cases, preventive ligating is not advisable, and the vessels should only be ligated during the operation itself when occasion arises.

[*Les Annales Dentaires*. Paris, July 1908.]

WHY THE PLANE MIRROR SHOULD BE SUBSTITUTED FOR THE CONCAVE MIRROR IN DENTAL PRACTICE. BY DR. J. M. CHATEAU.

After using the concave magnifying mirror for a long time, the dentist often notices fatigue in his eyes, which can be promptly

remedied by using a plane mirror. By doing so, we not only can see better but we save our crystalline lens and retard the threatening progress of hypermetropia and presbyopia. Optics teach that the luminous rays in a concave mirror travel in a similar way to those in a convex lens having the same focal distance. When looking into a concave mirror we see identically the same image as in a plane mirror which furnishes us with a virtual image back of it and in sympathy with it; this virtual image is magnified with a magnifying glass having the same focal distance and occupying the same position as the concave mirror. The result of this is that upon examination a posterior distal cavity presents itself in the concave mirror in the same way as an anterior mesial cavity lying symmetrically with the mirror, as if the image were lying back of the lens and were enlarged by a magnifying glass placed on the same plane and focal distance as the mirror. This leads to the observation that the image of the concave mirror outside of a certain plane is not clear and distinct; it is inexact and distorted, and it is magnified, which is not of vital importance, since we do not magnify anterior cavities. The cavity is also less lighted up than when the plane mirror is used. This is the chief objection to the use of the concave mirror in distal cavities, since it is of greater importance for the examination of a cavity to have it well illuminated than to have it slightly magnified.

The injuries inflicted upon the eyesight by the concave mirror are of twofold consequence, one immediate, the other progressive. The immediate injury is evinced by fatigue of the eyes, especially after the first days of usage of the magnifying mirror. This fatigue diminishes with the habit, and is due to the strain imposed upon the ciliary muscle which controls the curvature of the crystalline lens. The progressive injury is the same as the one produced by the unnecessary and inconsiderate wearing of convex spectacles, which elongate the optic axis and produce hypermetropia. In order to compensate the interposition of the convex lens between the virtual image upon the mirror and the retina, so that the image produced comes to fall upon the retina and not in front of it, our crystalline must be flattened. This strains the crys-

talline, which should be avoided as much as possible since this flattening process which ultimately leads to hypermetropia and presbyopia is sufficiently taken care of by old age. The plane mirror, then, affording the normal conditions of accommodation and vision, also guaranteeing more exactness, more light, and saving the ciliary muscle, should be given the preference over the concave magnifying mirror.

[*Deutsche Monatsschrift für Zahnheilkunde*,
October 1908.]

PHYTIN IN DENTISTRY. By DR. FRITZ
MÜLLER, BERLIN.

In rhachitic children it is not only important to preserve the teeth by dental instrumentation, but also to supply the teeth and bones by internal medication with a sufficient quantity of phosphorus. Röse of Dresden has demonstrated that the bones and teeth in breast-fed children only rarely exhibit rhachitic phenomena. One liter of woman's milk contains from 0.43 to 0.47 grams P_2O_5 in organic combination, while in cow's milk 1.81 grams P_2O_5 in one liter only contain 0.758 gram of phosphorus in organic form. The phosphorus in woman's milk is absorbed to almost ninety per cent. in the nursling's intestines, while the phosphorus in cow's milk is only one-half assimilated. Mineral phosphates cannot supply the lack of phosphorous food, since only the phosphoric alkalis are absorbed, but by no means assimilated, and therefore can neither serve in the building of tissue nor in replacing the phosphorus used up by the organism. None of the preparations of organic phosphorus on the market can be assimilated with the exception of phytin, which represents the organic phosphorus stored in the seed of hemp. Its chemical composition represents a double calcium-magnesium salt of anhydrous oxymethylene-diphosphoric acid, which according to Prof. Gilbert and Dr. Lippmann is non-poisonous. In forty-two cases of children whose deciduous teeth were poorly developed owing to rhachitic tendency, the permanent set as well as the physical and mental development was greatly benefited by phytin prescribed by the author. While the deciduous teeth showed a bluish color, with brittle enamel, soft dentin and predisposition to rapid caries, the permanent teeth erupted normally, and showed

slightly yellow color with little disposition to caries. Phytin prescribed for gravid women also most favorably influenced the product of lactation. In eleven cases mothers who had rhachitic children, after previous medication with phytin gave birth to perfectly normal children without any rhachitic phenomena. For nurslings phytin mixed with lactine, which is on the market under the name of "fortossan," is highly recommendable on account of its easy solubility. It is not only extremely valuable as a prophylactic in gravid women and in nurslings, but also in children whose teeth, owing to rhachitic disposition, are poor in phosphorus and inclined to caries. It will also render excellent services in diseases of the bones and the maxillæ in combination with operative treatment.

[*Bulletin du Syndicat des Chirurgiens-Dentistes*, Paris, August 1908.]

TREATMENT OF FACIAL NEURALGIA. By
DR. HENRI DAUSSET.

In his report before the French Congress of Physiotherapy, 1908, the author has presented a systematic study of the therapeutic value and the technique of the hot-air treatment of neuralgia, which has been advocated by Taylor of England, Bier of Germany, Frey of Baden-Baden, and many others. The principle of hot-air treatment is based on the analgesic effect of heat, which can be raised to 300° C. [*sic!*]. Dentists have applied this treatment for some time in hypersensitive teeth. It is particularly recommendable in facial and supraorbital neuralgias, which, if they are of superficial origin, quickly heal. Even in desperate cases which yielded to no other treatment, Schultz of Bonn has effected a cure in twelve out of twenty cases. In light facial neuralgias of dental origin hot-air treatment brings about an appreciable alleviation of pain, although it is necessary of course to get at the source of the disease by dental treatment. It is also valuable in dental inflammations if applied before suppuration has set in. When applied in cauterizing, the heat can be raised from 200 to 600° C., without causing more than a sensation of touch or leaving a deep scar. The active hyperemia may be raised to any intensity desired without any alteration of the epidermis, which enables a careful operator to repeat the treatment until the desired results are obtained.

In an article on the same subject of "neuralgias," Dr. Reinmöller of Rostock in the June issue of *Deutsche Monatsschrift für Zahnheilkunde* gives an exact definition of the term neuralgia, also a brief survey of its effects and causes of origin, dwelling at length on trigeminal neuralgia. Of all nerves the trigeminus is most frequently subject to neuralgia. In the therapy of this disease, the causal factor must above all be eliminated. Useless extractions will be reduced, if besides the customary examination, every case of trigeminal neuralgia is examined by means of the induction current and the skiagraph, which often render possible a diagnosis of the

etiology of even serious cases. Foreign bodies and retained teeth, which may provoke grave neuralgias, may easily be detected by the skiagraph. Even the nasal fossæ should be carefully examined, as their diseased condition frequently causes extremely serious neuralgia. The author recommends the therapeutic treatment as evolved by Schloesser of Munich, who injects eighty per cent. alcohol into the nerve-trunk. Of 14 cases treated by this method 11 have been completely cured. The injection of alcohol is extremely painful, yet anesthesia is not indicated, since the patient's statements are valuable for determining whether the nerve has been correctly reached.

PERISCOPE.

Preservation of Tincture of Iodin.—To prevent the formation of acid in alcoholic solutions of iodine, the addition of two parts of borax to one part of iodine is recommended. This admixture will even counteract any acid that has already formed. This acid has a very detrimental action on tissues painted with tincture of iodine, often resulting in painful desquamation and excoriation.—*Le Laboratoire et le Progrès Dentaire*.

Thermo-cautery for Pyorrhea Alveolaris.—Under local anesthesia the gingival pockets are split with the thermo-cautery on the labial side and thoroughly cauterized; necrotic alveolar portions are removed. After from ten to fourteen days the loosened teeth will be found to be firm again in their sockets, and the pyorrheal process, if treated at an early stage of the disease, will cease without relapse.—Dr. HOLECEK, Vienna, *Oesterreichische Zeitschrift für Stomatologie*.

The Odor of Iodoform and of Creasote.—The best method of removing the disagreeable odor of iodoform from the hands is to wash them in a solution of linseed meal. Clothes and linen will be sufficiently deodorized by rinsing them in tar-water to which a touch of wintergreen has been added. This method is also applicable for creasote and guaiacol. Rooms filled with the odor of creasote are rendered habitable by burning coffee in the open. Creasote pills, by sprinkling with coffee, are rendered almost odorless.—*Revue Trimestrielle Suisse d'Odontologie*.

Method of Holding a Crown for Polishing.—Take a small stick of modeling composition, heat one end, dip it in shellac, and insert it into the open end of the crown, which has been previously filled with plaster mixed with salt. The salt accelerates the setting of the plaster, which will be completed by the heat produced by the polishing. Hold the whole under a cold-water spigot and polish. To detach the crown, simply pass it slightly over a flame. The stick and plaster will come out, leaving the interior of the crown absolutely clean.—*Bulletin du Syndicat des Chirurgiens-Dentistes de France*.

Anesthesia of the Pulp for Extirpation of the Root-Fibers in a Tooth Amputated at the Cervical Edge for the Insertion of a Prosthetic Piece.—For the adjustment of a prosthetic piece, especially a crown, it is indicated to cut off a sound or slightly affected tooth, in order to insert a pin into the root or to adjust a crown to the contour. The more or less gangrenous or even sound pulp is exposed, and the extirpation is a very delicate matter, owing to the extreme sensitiveness of the terminal nerves. A solution of cocaine in alcohol 1:10 applied under pressure after the cocaine has been crystallized with hot air is not always satisfactory. A simple and rapid method is the following: By means of two tampons of soft rubber the mucous membranes at the level of the apex of the root in which the root-fibers are to be extirpated are compressed under slowly increasing pressure, lasting for about one minute. At

the same time, a jet of ethyl chlorid is directed against the pulp or even into the canal. The pain first produced by the cold disappears instantaneously, and with a nerve bristle (Ivory) the pulp is extirpated without any pain.—*Bulletin du Syndicat des Chirurgiens-Dentistes de France.*

Soda for Sterilizing Root-canals.—To sterilize root-canals before filling, a solution of fifty per cent. of caustic soda may be applied. Care must be taken not to bring it in contact with the gums or the lips, on account of the strongly caustic action of the soda. It is not necessary to dry the root-canals with hot air. It suffices to carefully clean the canals with cotton dipped in alcohol and finally in chloroform.—*Les Annales Dentaires.*

Filling Lower Teeth Without the Rubber Dam.—When filling lower teeth where the application of the rubber dam is for some reason impracticable, proceed as follows: Apply a napkin or cotton rolls and clamp, and beneath the napkin on the lingual side place a piece of sterilized sponge; this will absorb the saliva and keep the field of operation dry, better than cotton wool. In quite a long operation it will not be necessary to renew the sponge more than once or twice, while the napkin itself keeps perfectly dry. When a sponge is used in conjunction with the saliva ejector in this way, it proves the greatest comfort to both operator and patient.—B. BENNETTE, *British Journal of Dental Science.*

A Universal Interdental Splint.—As it is very important to get fractured parts of the mandible in place as soon as possible, the delay of making appliances to hold them in their proper relation led to the construction of what may be called a universal, adjustable chin-piece. This chin-piece consists practically of two pieces, extending back on each side of the jaw a little past the angle, also under the jaw far enough to afford good support, and still not interfere with the soft tissues in the sublingual space. It also extends up on the face as far as the malar bone. The chin-piece is made of cast aluminum made very thin. There are two lugs on the outside of each half of the chin-piece about on a line with the inferior border of the mandible. The lugs are about three inches apart and carry a strong rod, to which is fastened the tape or cord attached to the rubber splint upon the teeth, which is provided with corresponding short rods running parallel to those on the chin-piece. The rods in the rubber splint being fastened at but one end, form quite a

good spring, so that there is constant pressure between the chin-piece and the rubber splint upon the teeth, and so that should there exist a slight discrepancy in the coaptation of the fracture and of the occlusion of the teeth, this constant slight tension will gradually bring the parts to their proper place. While this is going on and the healing process is taking place, there is not any interference with the natural movements of the mandible, allowing the patient to partake of good nourishing food fairly comfortably.

The chin-piece is divided in the center, or at the median line of the chin, one side lapping the other, the lap being provided with a good strong thumb-screw working in a slot. This makes the chin-piece adjustable to fit any case, whether there is any swelling or not. This may be considered an important feature in this chin-piece, as these cases are often neglected two or three days before being attended to. If there is much injury to the soft tissue, the swelling is sometimes very great, and as this becomes reduced it requires readjusting of the chin-piece, which is easily accomplished by loosening the thumb-screw, adjusting, and then tightening again.—E. C. MOORE, *Odontoblast.*

Method of Dental Ligatures for Ununited Fracture of the Mandible.—In a case of ununited fracture of the mandible Dr. Shook tried a ligature frequently employed in orthodontia. He placed on the lower bicuspids on both sides bands of German silver, which by means of a screw and nut could be firmly adjusted to the teeth. On the labial side a tube was soldered on to permit of the introduction of a soft German-silver pin passing before the anterior teeth, to which it was ligated by means of a brass thread. This method is simply an improvement on that of Hippocrates, who ligated the teeth near the line of fracture. It presents most valuable advantages: The taking of an impression is unnecessary; the application can be made immediately after the accident, hence there is a diminution of pain and of the possibility of infection in the seat of the fracture; the abutments are strong and far removed from the line of fracture; the reuniting of the dental arches is brought about normally without discomfort to the patient; alimentation is not interfered with; in spite of the presence of the apparatus, which remains in the mouth until the bones have solidly grown together, radiographs can be taken without difficulty; the fracture can easily be watched and hygiene is easy; the ligatures are hidden from view. Moreover, this method allows of modification in detail:

The band may be replaced by brass thread, the number of abutments may be increased, a second band may be placed on several posterior teeth if it is desirable to reinforce the action of the apparatus.—*Société Clinique des Hôpitaux de Bruxelles per Les Annales Dentaires.*

Straightening Pivots in Tube Teeth.

—While soldering pivots to a base-plate before setting up the tube teeth, the direction of the pivots is sometimes changed. To straighten them never use pincers, since the pivot is liable to be bent. Rest the piece on the plaster model, take a flat bending pin such as jewelers use, hold it tightly against the full length of the pin, and bring the tooth to the desired axis. This method is only applicable, however, if the pivot diverges but slightly from the desired direction.—*Journal Odontologique de Paris.*

Mountain Toothache.—Dr. Hafner of Zurich reports that all the engineers and workmen engaged in the construction of the Jungfrau railroad, after staying for about ten days in an altitude of over 3000 meters, suffer from toothache accompanied by swelling of the gums and active congestion, the pain rendering mastication of food very difficult. The pains subside after a few days without leaving any traces on the teeth. Dr. Hafner considers this mountain toothache as a simple phenomenon of acclimatization involving vascular adjustment to the altered barometric pressure.—*Le Fribourgeois per Revue Internationale de Prothèse Dentaire.*

Artistic Reproduction of the Margins and the Rugæ in Artificial Dentures.

—In filling up the margins that fit round the lingual side of natural teeth, there is scope in vulcanite work for a subtle bit of contouring in imitation of the normal gum tissue underlying. Such delicate contouring gives the least possible chance of irritation to the tongue, and incidentally has a very satisfying look about it. In both plate and vulcanite work, that precise margin along which the lingual and the tooth-fitting surfaces meet should, as far as practicable, follow and keep in contact with the widest horizontal diameters of the tooth. The fitting margins will thus best steady the plate, and not prevent, by hanging on the bulbous tooth, the last niceties of adaptation to the soft tissues being completed. The posterior margin of the plate may always be a little more decidedly curved forward in its highest or median portion, more completely clearing the soft palate there, without appreciably lessen-

ing the area of support. In upper dentures we sometimes apply an additional ornament by reproducing the forms of the rugæ on the lingual side of the palate. In plate work the natural rugæ underlying inevitably show up on the lingual side. If the existing rugæ be very blunt, or ill-defined, is it good practice to sharpen their forms or throw them up more prominently on the plate? Most probably it is. In replacing other parts, as teeth or gum, the ugliness or deformities of the lost structures are seldom reproduced other than with the object of disguising artificiality. In rugæ we have chiefly to consider their function, and as not much appears to be known with certainty with regard to their function, the best thing we can do is to keep close to the typical forms of rugæ observed in the plates of the best-equipped natural dentures.

Further, it is difficult to see any harm in so modifying the rugæ in their arrangement, form, and symmetry as to distinctly improve the plate from the decorative point of view.—D. M. SHAW, *Dental Record.*

Tin and Gold.—Tin and gold in combination have been used consistently by a sufficient number of successful operators, who have seen it stand the test of time, to prove that it is no longer an experiment. That it is not more generally used is to be regretted from the standpoint of the public. Those who have used it and watched it for a quarter of a century or so know fully well that, when used where indicated, it has no equal for saving teeth. Those who have not used it successfully are in no position to judge its value.

Inlays have been used sufficiently long to absolutely disprove the theory advanced by some that decay does not recur about the margins. No system of inlays will ever entirely take the place of good *bona fide* old-time gold, and of gold and tin fillings. The writer has gold fillings in his own teeth that were inserted about thirty-five years ago, and he frequently sees such fillings that have stood the stress of time for from forty to fifty years.

The trouble with the inlay is that it compels the sacrifice of a needless amount of tooth-structure, that is, if it is a fad of the operator and is used where fillings are indicated. The easiest thing to do in dental practice is to make a Taggart inlay; that is, of course, a poor one. Good inlays are usually very difficult propositions, and frequently more so than would be fillings in the same cases. So please do not decry "tin and gold," even though you use Taggart inlays; for the other material has long since demonstrated its value.—C. E. KELLs, *Dental Register.*

Soothing Dressing.—In cases of chronic or acute pulpitis excellent results are obtained by applying a cotton tampon saturated with a solution of tincture of iodine, eucain, and cocaine mixed in equal parts.—*Journal Odontologique de Paris.*

Suppuration of the Antrum of Highmore.—By means of a trocar mounted on a mandrel and provided with a guard two centimeters from its point, the antrum is trepanned at the level of the canine fossa. The guard is intended to prevent the trocar from perforating the inferior wall. After the trocar has penetrated into the antrum, the mandrel is withdrawn and through the opening in the trocar, two Pravaz syringes full of iodoform-ether 10:100 are injected. After waiting a few minutes, about five cubic centimeters of liquefied vaselin mixed with menthol and silver nitrate are injected into the cavity. The vaselin is prepared after the following formula:

Silver nitrate,	0.30 centigrams
Menthol,	0.10 "
Vaselin,	30 grams

The surplus is allowed to flow out and the trocar withdrawn. This operation, which is naturally performed under ether, has yielded constant and perfect results in all cases of infection and suppuration of the maxillary sinus.—*Le Laboratoire et le Progrès Dentaire.*

Spring Pivots.—Spring pivots as advocated by Müller-Wädensweil, which offer great advantages in removable bridge work, are not always to be had in the desired strength in dental depots. A simple method of manufacturing round spring pivots is the following: By means of a draw-plate with sufficiently large holes, exactly fitting tubes are drawn over wire pins of different sizes and soldered at the seam. In order to prevent the solder from flowing into the interior of the tube and from stopping up the passage for the pivot, a string coated with wet whiting is pulled through the case. The string is left in the case during soldering; its burned remains can easily be removed. A piece of the tube thus prepared is cut off at the length desired and fitted with a bottom. The soldering of the bottom may be avoided by inserting a fitting, oil-coated pin full length of the tube, which will prevent any cement from entering the tube while fastening it into the root-canal. Along the whole length of the pivot, which is somewhat longer than the tube, a groove is filed, which is to receive the spring. For the springs, round wire of a thickness corresponding to the pivot groove

(0.35 to 0.4 mm. thickness) is used. The spring need not be soldered if it be inserted into a hole in the groove near the lower end of the pivot, and bent at right angles. Before inserting the spring it is slightly bent outward. These spring pivots offer the advantage that the round pivot and its case demand a smaller root-canal than the square pivots, thus leaving the root-walls thicker and stronger. The pivot can also be longer and is better fitted to stably carry a crown or a prosthetic piece. The wire spring is strong and simple, and while holding firmly can easily be exchanged. The only disadvantage is the possibility of a revolution of the pin in the tube. In bridges this is of no account; in pivot-teeth this danger can be avoided in different ways, especially by uniting at least half of a root-cap with the crown. For thick pivots 18-karat gold or even dental alloy, for thinner ones twenty per cent. platino-iridium can be used. For the springs the following 18-karat alloy of gold and platinum is advisable: Fine gold 18, copper 4, silver 1, platinum 1. According to the material used for the pivot, the tube may be made of 18-karat gold, dental alloy, or platino-iridium.—ZIERLER, *Deutsche Zahnärztliche Zeitung.*

Preparing a Cast Inlay in Large Restorations, where a Badly Decayed Root must be Employed as Anchorage.—Prepare the root by excavating all of the carious dentin, and then ream out the canal until solid tooth-substance is reached, and the margins are well defined; having accomplished this, select a Justi, White, Brewster, Davis, or other detachable pin crown suitable for the case, fit the pin to place, and after having done any necessary grinding to fit the crown to place, vaselin the gingival portion, soften a small piece of inlay wax, press down around the pin and gingival surface of the crown, pass this through the flame and press to place, having the root-canal moist so that the wax can be easily withdrawn. After chilling, withdraw, trim off any excess of wax, and replace in the canal to make sure that the wax has not become distorted in the carving process. After you have ascertained that the crown is in correct position, again withdraw and place the sprue-pin in position by heating the pin and carefully inserting into the wax at a convenient point, usually on the gingivo-lingual aspect; again insert the crown into the root-canal with the sprue-pin in place, if possible, to be sure that the wax has not been distorted in inserting the heated sprue-pin. Remove, separate the crown from the wax, invest, and after carefully drying out and

burning out the wax, cast either by the steam, compressed air or, better still, the vacuum or suction method.—B. H. KERSHAW, *Bur*.

How to Copper-coat Aluminum.—Prepare a bath with 30 parts of sulfate of copper, 30 parts of cream of tartar, and 25 parts of soda in 1000 parts of water. After thoroughly cleaning, the objects to be copper-coated are immersed in this bath.—*Le Laboratoire et le Progrès Dentaire*.

Selection of Teeth for Small Mouths.—In many cases of selecting teeth for a small mouth it is difficult to secure properly formed molars, as the manufacturer generally reduces the size of the molars to correspond with the incisors, thereby losing almost entirely the proper function of these teeth. It is advisable in such cases, whenever possible, to select the incisors, canines, and bicuspid from a small set and the molars from a larger set, thereby securing a good surface for mastication.—W. J. WHITEMAN, *Odontoblast*.

Classification of Cavities.—A simple classification of cavities that will indicate the cause of decay, preparation and outline of cavity and instrumentation thereof, is preferable to the prevalent one which simply classifies cavities according to the surface on which they occur, and give us no guide for the difference in treatment. The former complex classification gives us also the confusing number of twenty classes of cavities to be considered.

The classification we deem preferable has but three general classes, each having two subdivisions:

Class I. Cavities on any surface other than the approximal. (a) Cavities arising from structural imperfections, as pits and fissures. (b) Cavities in the gingival third—not pit cavities of the labial, buccal, and lingual surfaces.

Class II. Cavities on the approximal surfaces of incisors and canines. (a) Those not involving the incisal angle. (b) Those requiring the restoration of the incisal angle.

Class III. Cavities starting on the approximal surfaces of bicuspid and molars. (a) Those not involving the occlusal surface. (b) Those that do involve the occlusal surface.

Class I (a) cavities are always on clean surfaces, require no extension of their marginal outline for prevention of re-decay, no separation or clamps, and can be prepared entirely by the use of the bur, if desired.

All cavities other than class I (a) are on unclean surfaces of the teeth. Class I (b) cases

usually require the application of the rubber-dam clamp; and classes II and III require the separator. Cavities of class III require a number of special forms of instruments for their proper separation.

The gingival margins of class I (b), class II, and class III cavities should be extended beneath the gum margin; and all the other margins of these cavities must be extended to self-cleansing surfaces, or in other words, to surfaces that are swept by the tongue, cheeks, or the food in mastication.

The margins of class I (a) cavities, owing to their being on clean surfaces, need no extension other than is required to obtain a proper finish to the filling.

With the foregoing principles clearly understood, it is readily seen that the most important consideration in the preparation of a cavity is the location of the cavity outlines. This should be determined first, and the rest of the cavity preparation made to conform thereto.—H. E. FRIESELL, *Dental Forum*.

An Amalgamator, a Mechanical Device for Amalgamating Alloys.—The late Mr. Thomas Fletcher was the first to draw attention to the advantages of amalgamating alloys for filling by shaking them in a glass tube. It is claimed for amalgam made in this manner that more perfect amalgamation is effected, it being impossible for particles of metal to become burnished as may occur when force is applied in a mortar. This and other methods, however, involve a certain expenditure of time on the part of the operator or his assistant.

The apparatus designed consists of a clock-work motor, which imparts movement to a pendulum carrying a small glass tube, this movement being as much as possible like that of the hand and wrist when shaking a tube. This apparatus is termed an amalgamator, and it has proved most useful in practice, for by its aid a perfect mix may be obtained ready at any desired time.

The proportions of alloy and mercury being weighed, or measured with Mr. W. J. May's apparatus or Tulloch's spoon, are placed in the tube and the motor is started. An operator knowing how long the particular make of alloy he prefers takes to amalgamate, may have this ready for use by the time the preparation of the cavity is completed. The mix is sufficiently amalgamated when it has the appearance of coarse gunpowder, but if left sufficiently long can be worked up into a ball.

This apparatus, if attached to an electric engine, lathe, or water motor, may be found useful as a time-saver, and being an instru-

ment of precision, is suitable in all cases where it is desired to carry out experimental work, as by its aid alloys may be amalgamated at a definite speed, and for a definite time.—W. FRANCIS MELLERSH, *Proceedings of Royal Society of Medicine*.

Treatment of Maxillary Sinusitis.—The principle of treatment of maxillary empyema consists in treating the infected cavity through the nasal passage, which is the natural communication with the nose, and in avoiding the production of a new and persistent communication with the bucco-pharyngeal cavity. Recent and light cases are first syringed through the median meatus. In old suppurations with fetid odor and thick secretions, the opening of the sinus into the median meatus must be enlarged by perforating, if necessary, the turbinated bone and the inferior meati, according to Réthi's method. In chronic and serious cases a wide opening of the canine fossa is indicated. After inspecting and curetting the cavity and producing a wide counter-opening into the median meatus, the perforation is carefully closed. Subsequent treatment is again administered through the median meatus. Only in cases where nasal stenosis is so pronounced as to render nasal treatment absolutely impossible, or where patients with distant domicile cannot them-

selves syringe their sinuses through the median meatus, treatment is to be administered through the buccal opening (alveolar orifice). Gerber condemns Luc-Caldwell's method of depriving the patient of his inferior turbinated bone, and of exposing him to the discomforts of an artificial atrophic rhinitis with subsequent abundant scabs.—*La Quinzaine Thérapeutique per Les Annales Dentaires*.

Tube Teeth in Artificial Dentures.—With regard to the kind of tooth used for many cases of artificial dentures, no other tooth has so many structural advantages as the tube tooth. The splendid work done with it by English dentists in the past has not been excelled in any country as to fine, simple, strong, and accurate craftsmanship. There can be little doubt that it has fallen a good deal into disuse, chiefly from the same causes as have vitiated other arts, the craving for cheapness, and the universal stress of commercialism.

The only adverse criticism ventured on past work with tube teeth is that they were often too zealously pressed into service in the attempt to make good the considerable loss of gum by using a very long-necked tooth, the result being objectionable in appearance and somewhat uncleanly.—D. M. SHAW, *Dental Record*.

OBITUARY.

DR. LUIS LANE DUNBAR.

DIED, at his home in Belvedere, Cal., on Wednesday morning, December 30, 1908, LUIS LANE DUNBAR, D.D.S., in his sixtieth year.

While Dr. Dunbar had not been in robust health for some months before, the end came as a great surprise and very quickly, as he had devoted the day before to work in his office and had not complained of anything unusual up to a few minutes before his death.

He was born in Evansville, Ind., September 1, 1849, and in 1863 went to San Francisco, where he attended the public schools, and then St. Mary's College. He later went to Ohio, being graduated in dentistry from the Ohio College of Dental Surgery in 1874, returning then to California.

Dr. Dunbar was one of the early practition-

ers of dentistry of that state, having located in San Francisco thirty-five years ago. He early reached a prominent and enviable position in the profession, and for a great many years was an active member in different dental societies and educational work.

Aside from his chosen life-work of dental practice which engaged so much of his time and attention, he was no less devoted to the Dental Department of the University of California, becoming identified with it at the time of its organization in 1882. He gave freely of both his time and energy in its interest for a great many years, and kept in touch with it, enjoying an honored position on its staff to the time of his death. He served it in different capacities, first as clinical instructor, 1882-84, then as professor of pathology and therapeutics, in 1885, and from

1888 to 1899 as professor of operative dentistry and dental histology. He was re-elected dean of the college each year from 1889 to 1899. From the last-named date to the end of his life he occupied the position of emeritus professor of operative dentistry.

He was a member of the California State Dental Association, of the Freemasons, and a life-member of Delta Sigma Delta Fraternity.

In 1874, he married Miss Jennie McLaughlin, who survives him, together with their son, Stewart Boyd Dunbar.

SOCIETY NOTES AND ANNOUNCEMENTS.

NATIONAL DENTAL ASSOCIATION.

THE thirteenth annual meeting of the National Dental Association will be held in Birmingham, Ala., on March 30 and 31, and April 1 and 2, 1909.

Organization of Sections.

SECTION I.

Prosthetic Dentistry, Crown and Bridge Work, Orthodontia, Metallurgy, Chemistry, and Allied Subjects.

HARRY E. KELSEY, *Chairman*, Commonwealth Bank Bldg., Baltimore, Md.

H. H. JOHNSON, *Vice-chairman*, 306 Second st., Macon, Ga.

J. S. SPURGEON, *Secretary*, Hillsboro, N. C.

SECTION II.

Operative Dentistry, Nomenclature, Literature, Dental Education, and Allied Subjects.

W. G. EBERSOLE, *Chairman*, 800 Schofield Bldg., Cleveland, Ohio.

R. H. WALKER, *Vice-chairman*, 231 Main st., Norfolk, Va.

L. L. BARBER, *Secretary*, 311 Summit ave., Toledo, Ohio.

SECTION III.

Oral Surgery, Anatomy, Physiology, Histology, Pathology, Etiology, Hygiene, Prophylaxis, Materia Medica, and Allied Subjects.

C. C. ALLEN, *Chairman*, Rialto Bldg., Kansas City, Mo.

J. E. CHACE, *Vice-chairman*, Ocala, Fla.

J. W. HULL, *Secretary*, Altman Bldg., Kansas City, Mo.

V. E. TURNER, *President*,
Raleigh, N. C.

CHAS. S. BUTLER, *Sec'y*,
Buffalo, N. Y.

PROGRAM.

Drs. James McManus, Hartford, Conn., E. C. Kirk, Philadelphia, Pa., and L. G. Noel, Nashville, Tenn., will present essays at the general session.

The following partial program of the sections is announced:

Section I.

"The Development of the Face." By Martin S. Dewey, Kansas City, Mo.

"The Behavior of Certain Metals in the Mouth." By C. J. Grieves, Baltimore, Md.

"Crown and Bridge Work." By H. H. Johnson, Macon, Ga.

Section II.

"Dental Education." By Herbert L. Wheeler, New York, N. Y.

"The Elimination of Fear in the Practice of Dentistry." By W. T. Jackman, Cleveland, Ohio.

"On Operative Dentistry." By J. R. Callahan, Cincinnati, Ohio.

"On Nomenclature." By S. D. Ruggles, Portsmouth, Ohio.

Section III.

"Dental Literature." By G. S. Vann, Gadsden, Ala.

"Comparative Anatomy." By A. H. Thompson, Topeka, Kans.

A complete list of the sections, with a full list of clinics, railway rates, etc., will be announced in the next issue of this journal.

All preparations for the meeting are well advanced, and a large attendance is assured.

Change in Membership Regulations.

At the 1908 meeting, the National Dental Association adopted an amendment making all members in good standing in their state dental societies, or their allied societies, eligible to membership in this association, by presenting to the proper authorities at the regular meeting a certificate signed by the president and secretary of any such society.

Those desiring to take advantage of their privileges under said amendment should act promptly, as the National Association meets early next year, the last Tuesday of March, 1909, at Birmingham, Ala.

Blanks can be secured from the secretaries of the various state dental societies or the undersigned.

H. C. BROWN, *Corresponding Sec'y*,
185 E. State st., Columbus, O.

INSTITUTE OF DENTAL PEDAGOGICS.

The following officers were elected during the sixteenth annual meeting of the Institute of Dental Pedagogics, held in the Planters Hotel, St. Louis, Mo., December 30, 1908, to January 1, 1909: Ellison Hillyer, Brooklyn, N. Y., president; John Q. Byram, Indianapolis, Ind., vice-president; B. E. Lischer, St. Louis, Mo., secretary-treasurer; D. H. Squire, Buffalo, N. Y., member of Executive Board; H. E. Friesell, Pittsburg, Pa., member of Commission on Text-books.

The next place of meeting will be Toronto, Can., December 28 to 30, 1909.

B. E. LISCHER, *Secretary-Treasurer*.

AMERICAN NATIONAL COMMITTEE ON FIFTH INTERNATIONAL DENTAL CONGRESS.

TO BE HELD AT BERLIN, AUGUST 1909.

At a meeting of the Executive Council of the National Dental Association held at Pittsburg, Pa., Saturday, October 10, 1908, the following were appointed as the American National Committee, to forward the work of the Fifth International Congress and provide for the representation of American dentistry at that congress—to be held in Berlin, Ger., August 1909:

American National Committee.

Edward C. Kirk, Philadelphia, Pa., *ch'man*.
Burton Lee Thorpe, St. Louis, Mo., *sec'y*.
Truman W. Brophy, Chicago, Ill.
A. W. Harlan, New York, N. Y.
B. Holly Smith, Baltimore, Md.
G. E. Savage, Worcester, Mass.
Wm. Carr, New York, N. Y.
W. W. Walker, New York, N. Y.
J. D. Patterson, Kansas City, Mo.
Gordon White, Nashville, Tenn.
Chas. R. Turner, Philadelphia, Pa.
Chas. McManus, Hartford, Conn.
G. V. I. Brown, Milwaukee, Wis.
N. S. Hoff, Ann Harbor, Mich.
F. E. Ball, Fargo, N. Dak.
L. P. Dotterer, Charleston, S. C.
Eugene H. Smith, Boston, Mass.
Chas. L. Alexander, Charlotte, N. C.

COMMITTEE ON ESSAYS.

Edward C. Kirk, *chairman*.
Burton Lee Thorpe, *secretary*.
L. P. Dotterer.

COMMITTEE ON CLINICS.

Wm. Carr, *chairman*.
J. D. Patterson, *secretary*.
Chas. L. Alexander.

ILLINOIS STATE DENTAL SOCIETY.

The forty-fifth annual meeting of the Illinois State Dental Society will be held at Danville, May 11, 12, 13, and 14, 1909.

R. J. Hood, *Sec'y*,
Sparta, Illinois.

NATIONAL ASSOCIATION OF DENTAL FACULTIES.

THE National Association of Dental Faculties will hold their annual meeting in connection with the National Association of Dental Examiners in the Hotel Chamberlain, Old Point Comfort, Va., August 2, 3, and 4, 1909, commencing at 10 A.M.

Rates will be the same as the National Association of Dental Examiners. Railroad and steamship rates will be given at a later date.

B. HOLLY SMITH, *Chairman*.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

THE twenty-seventh annual meeting of the National Association of Dental Examiners will be held at the Hotel Chamberlain, Old Point Comfort, Va., the first session opening at 10 o'clock A.M., Monday, August 2, 1909, and continuing during the 3d and 4th.

The result of the mail vote by the committee to ascertain the consensus of opinion as to place and date, from October 19th to the present date, was ninety-one votes for Old Point Comfort the first three days of August, thirteen for Birmingham in March, seven for Birmingham in July; the president has therefore selected Old Point Comfort.

The rates will be: American plan \$3.00 per day without bath and \$4.00 per day with bath. Large and commodious meeting-rooms will be furnished free. Railroad and steamship rates will be furnished at a later date.

CHAS. A. MEEKER, *Sec'y*.

ACADEMY OF STOMATOLOGY.

FIFTEENTH ANNIVERSARY.

ON February 19, 1909, the fifteenth anniversary of the founding of the Academy of Stomatology will be held at the College of Physicians, Philadelphia. It is to be a meeting of unusual interest, where dentists and medical men of national repute will take part.

The subject for the evening will be trifacial neuralgia. Dr. J. Bethune Stein of New York will report on some vivisection experiments and show some lantern slides, where the inferior dental canal of a dog has

been extirpated, care being taken to leave the tips of the adjacent roots untouched. He will then by slides demonstrate whether or not the pulps have been affected in a pathological way as to their nervous and blood supply.

Dr. Truman W. Brophy of Chicago, who in the course of his surgical operations has employed this same experiment on human beings and has found under these conditions that the pulps of the teeth next to the extirpated canal are not necessarily destroyed, will give a fifteen-minute paper on the peripheral causes of trifacial neuralgia and the necessary surgical procedure in its treatment.

Dr. John B. Deaver will give a ten-minute paper on intracranial trifacial neuralgia and the surgical treatment thereof.

Dr. John K. Mitchell will give a ten-minute paper on the symptomatology and treatment from the general practitioner's point of view.

The discussion of these papers will be opened by many prominent men—Dr. James E. Power of Providence, Dr. I. Norman Broomell, Dr. J. Chalmers Da Costa, and Dr. Morris J. Lewis.

A cordial invitation to attend is extended to all practitioners who are interested in the subject.

AMERICAN DENTAL SOCIETY OF EUROPE.

THE thirty-sixth annual meeting of the American Dental Society of Europe will be held in Wiesbaden, Germany, on April 9, 10, and 12, 1909. An interesting program is already assured. A most cordial invitation is extended to members of the profession to be present.

T. G. PATTERSON, *Hon. Sec'y*,
2 Quai des Eaux Vives, Geneva, Switzerland.

COMPLIMENTARY BANQUET TO DR. C. R. BUTLER.

THE dental profession of Cleveland, Ohio, will give a complimentary dinner to one of its most honored members, Dr. C. R. Butler, on March 11, 1909, at the Hollenden Hotel, at 7 P.M., in commemoration of the completion of fifty-one years of dental practice by the doctor. This will be a democratic affair, to

which all ethical dentists are invited. The price per plate will be within the reach of all. Those desiring a place at the banquet will kindly notify the secretary at least ten days before.

S. B. DEWEY, *Sec'y*,
Lennox Bldg., Cleveland, Ohio.

DELTA SIGMA DELTA FRATERNITY

AT SEATTLE EXPOSITION.

THE Seattle Auxiliary wishes to announce the annual Supreme Chapter meeting of Delta Sigma Delta Fraternity in Seattle, on July 21, 22, and 23, 1909. July 24th will be "Delta Sigma Delta day" at the Alaska-Yukon-Pacific Exposition.

C. F. Fiset, *Historian*.

UNIVERSITY OF BUFFALO DENTAL ALUMNI ASSOCIATION.

THE tenth annual meeting and clinic of the Alumni Association of the Dental Department of the University of Buffalo will be held on Friday and Saturday, February 19 and 20, 1909, in the dental building. An excellent program is being prepared. All graduates and ethical practitioners are invited to attend and participate in the meeting.

HARRY F. TANNER, *President*,
ABRAM HOFFMAN, *Ch'man Exec. Com.*,
GEO. B. MITCHELL, *Sec'y*,
483 Main st., Buffalo, N. Y.

ST. LOUIS DENTAL COLLEGE ALUMNI ASSOCIATION.

THE Alumni Association of the St. Louis Dental College (formerly Marion-Sims), will hold their annual clinic at the college building, Grand ave. and Caroline st., about May 20th or 25th.

An excellent program is being prepared. Special attention is being given to the clinical program.

All ethical members of the profession are cordially invited to be present. Program and exact date to be published in later issues of this journal.

S. T. McMILLIN, *President*.
JOHN B. O'BRIEN, *Ch'm Publicity Committee*,
5761A Etzel ave., St. Louis, Mo.

ST. LOUIS SOCIETY OF DENTAL SCIENCE.

THE St. Louis Society of Dental Science, at the December meeting, elected the following officers: W. E. Brown, president; Clarence O. Simpson, vice-president; G. E. Hourn, secretary; C. S. Dunham, treasurer; J. B. Winkelmeyer, curator. Executive Committee—E. E. Haverstick, G. H. Westhoff, E. J. Lenzen, Burton Lee Thorpe, J. B. Winkelmeyer. Advisory Council—G. A. Bowman, A. H. Fuller, D. O. M. Le Cron, Richard Summa, W. L. Whipple, H. F. Cassel, and E. P. Dameron.

G. E. HOURN, *Sec'y*,
725 Metropolitan bldg., St. Louis, Mo.

READING DENTAL SOCIETY.

AT the eleventh annual meeting of the Reading Dental Society, held in Reading, Pa., the following officers were elected for the ensuing year: Wm. Meter, president; C. S. Mogel, vice-president; Geo. S. Schlegel, secretary; John T. Bair, treasurer. Executive Committee—Geo. F. De Long (chairman), O. J. Specker, and C. B. Grim.

GEO. S. SCHLEGEL, *Sec'y*.

FIRST DISTRICT (MICH). DENTAL SOCIETY.

THE annual all-day clinic of the First District Dental Society, state of Michigan, will be held on Saturday, February 13, 1909, at Detroit. For particulars address

J. A. WALKER, *Sec'y*,
284 Gr. River ave., Detroit, Mich.

COLORADO COLLEGE OF DENTAL SURGERY.

THE annual midwinter clinic of the Alumni Association of the Colorado College of Dental Surgery and the Denver Dental Association will be held at the college building, February 11, 12, and 13, 1909. All ethical dentists are invited to attend and take part. For particulars address

A. W. STARBUCK,
14th and Arapahoe sts., Denver, Colo.

MISSISSIPPI DENTAL ASSOCIATION.

THE sixteenth annual meeting of the Mississippi Dental Association will be held in Natchez, May 11, 12, and 13, 1909.

L. B. PRICE, *Sec'y*,
Corinth, Miss.

STATE UNIVERSITY OF IOWA, DENTAL DEPARTMENT.

THE sixth annual meeting of the Alumni Association of the College of Dentistry of the State University of Iowa will be held March 9 and 10, 1909, in the dental college building at Iowa City, Iowa. A profitable meeting is assured, with good clinics and papers. All ethical practitioners are requested to reserve the dates and plan to be present.

LEON L. BRANSON, *Sec'y*,
Iowa City, Iowa.

MONMOUTH COUNTY (N. J.) DENTAL SOCIETY.

THE regular monthly meeting of the Monmouth County Dental Society was held at the Globe Hotel, Red Bank, N. J., on Wednesday evening, January 6, 1909.

After the usual banquet an essay was read by Dr. R. W. Jewett of Red Bank, N. J., on "Nitrous Oxid." Also a demonstration was given on "Gold-leaf Beating," by Mr. Frank Chadwick, also of Red Bank.

A large number of members were present from Red Bank, Long Branch, and Asbury Park.

HERBERT E. WILLIAMS, *Sec'y*,
Red Bank, N. J.

VERMONT STATE DENTAL SOCIETY.

THE thirty-third annual meeting of the Vermont State Dental Society will be held at Hotel Berwick, Rutland, Vt., May 19, 20, and 21, 1909. A cordial invitation is extended to all.

THOMAS MOUND, *Sec'y*,
Rutland, Vt.

ARMY DENTAL CORPS.

Changes of stations of dental surgeons, U. S. Army, for month ending January 9, 1909:

Alden Carpenter, relieved from duty with Army of Cuban Pacification, and ordered to Fort Hancock, N. J., for duty.

Samuel W. Hussey, granted leave of absence for one month, twenty-three days.

John D. Millikin, sailed from San Francisco, Cal., January 5, 1909, on the "Thomas," for duty in the Philippines Division.

George E. Stallman, left Fort Sill, Oklahoma, for duty at Fort Sam Houston, Texas.

Edwin P. Tignor, left Fort Howard, Md., and arrived at Fort McHenry, Md., for duty; left Fort McHenry, Md., for duty at Fort Monroe, Va.

Jean C. Whinnery, left Fort Ward, Washington, for duty at Fort George Wright, Washington.

MINNESOTA BOARD OF EXAMINERS.

THE next regular meeting of the Minnesota Board of Examiners for the examination of applicants for license to practice dentistry in Minnesota will be held at the dental department of the State University in Minneapolis, beginning on March 9, 1909, at 9 A.M.

All applications must be in the hands of the secretary by March 1, 1909. For further information address

GEO. S. TODD, *Sec'y*,
Lake City, Minn.

NEW JERSEY BOARD OF REGISTRATION.

THE New Jersey State Board of Registration and Examination in Dentistry will hold their semi-annual examination in the Assembly chamber of the State-house, Trenton, N. J., beginning Tuesday, July 6, 1909, and continuing through the 7th and 8th.

Practical examination will be held on the 6th, theoretical examination on the 7th and

8th. Practical work consists of soldering a gold or silver plate, one gold filling, and one amalgam filling. The gold filling must be an approximal one, with an approximating tooth in position.

Candidates are requested to bring their patients. Photograph and preliminary creden-

tials must accompany the application. Sessions begin promptly at 8 A.M., each day.

Applications must be in hands of the secretary ten days prior to the examination.

CHARLES A. MEEKER, D.D.S., *Sec'y*,
29 Fulton st., Newark, N. J.

UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING DECEMBER 1908.

December 1.

- No. 905,132, to R. A. BACON. Adjustable file handle.
No. 905,369, to H. P. ROBERTS. Disinfecter for dentists' cuspidors.
No. 905,447, to JULIUS MENTZ. Attachment for chairs.
No. 905,464, to C. C. SADLER. Sand or abrasive paper holder.
No. 905,479, to RUDOLF SYKORA. Hinge for dental articulators.
No. 905,535, to E. E. HOLMES. Dental Appliance.
No. 905,725, to ANGUS MACPHEE. Powder receptacle.

December 8.

- No. 905,886, to J. H. KINNEY. Tooth-brush.
No. 906,113, to E. F. CURTIS. Flexible shaft.
No. 906,315, to E. R. SIBERT. Chuck.
No. 906,383, to C. G. CARROLL and WM. H. ADAMS. Solder for aluminum.

December 15.

- No. 906,556, to FRANK C. PERKINS. Vulcanizer.

- No. 906,637, to HARRY B. LAMBERT. Aluminum solder.
No. 906,801, to EDWARD HICKEY. Detachable handle for pans.
No. 906,869, to C. B. GEHRINGER. Dental tool-holder.
No. 906,911, to P. B. McCULLOUGH. Tooth crown or plate and swaging device therefor.
No. 907,003, to R. T. BURNLEY. Dental instrument.

December 22.

- No. 907,326, to L. E. EVSLIN. Artificial tooth.

December 29.

- No. 907,815, to J. P. KELLEY. Dental plugger.
No. 907,882, to W. J. REYNOLDS. Dental punch.
No. 907,949, to E. H. BALLOU. Artificial tooth.
No. 908,056, to P. S. WHITNEY. Dental appliance.
No. 908,312, to F. NEDERMAN. Cuspidor.
No. 908,336, to A. W. SCHRAMM. Wrist joint for dental engine.

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ORIGINAL COMMUNICATIONS.

SOME CONSIDERATIONS CONCERNING THE FORMS OF ARTIFICIAL BICUSPID AND MOLAR TEETH.

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(Read before the Pennsylvania State Dental Society, at its annual meeting, Philadelphia, June 30, July 1 and 2, 1908.)

THE necessity for an improvement in the forms of artificial molar and bicuspid teeth as generally obtainable at present from the dental depots, which has for some time been a subject of thought on the part of those interested in the prosthesis of full dentures, has recently been brought forcibly to the attention of the profession in a letter from Dr. J. Leon Williams to the editor of *Items of Interest*. What the needs of the profession are in this regard has not as yet been perfectly determined, and this problem must perforce be settled before the manufacturers can undertake to supply the demand. It is with a view to assisting in the solution of this main question, as to what is desired of these teeth, that I am asking your attention to some considerations pertaining to the theoretical and empirical determination of their forms.

Speaking broadly, we desire to obtain

teeth of such form that when mounted upon artificial dentures *lege artis*, they shall be most effective for purposes of mastication. As the six anterior teeth of each series are not concerned with the masticatory functions of the denture—having their forms usually determined chiefly by considerations of appearance—they of course are not to be included in this discussion.

It will probably require no defense to advance as the major premise of our question that we desire artificial teeth which in form follow the general plan of the natural teeth, so far as that relates to effectiveness, yet which are altered as may be necessary to adapt them for use on plate dentures, where the fact that they are not fixed by being embedded in the bone alters the conditions of their operation. That the natural denture which follows the general typical plan for the human masticating mechanism

is the most effective instrument for the comminution of man's food which has been or in all probability could be devised, will hardly be disputed. It is but one detail of nature's plan of adapting the form to the function, found throughout the organic world. This is exemplified in the masticatory apparatus of every animal. The mechanical genesis of tooth-forms in its relation to the movement of the mandible in the evolutionary development of the various species in the animal kingdom has been exhaustively treated by John Ryder (¹) and his conclusions as to the wonderful adaptation of each dental apparatus to the food it is destined to comminute serve as a valuable background to our argument.

THE HUMAN DENTAL MECHANISM.

The human dental mechanism in its typical form is worthy of our study, and we shall hope to get from it much information as to the forms of substitutes for its lost members. It may be remarked that few if any natural dentures follow with mathematical precision this typical plan, which is ideal rather than real, and that many natural dentures exist which fall short of it in many particulars, yet serve their owners entirely satisfactorily. Yet the fact remains that the more nearly they approach this ideal, the more effective they are as mechanical instruments; and furthermore, that as the artificial denture operates under far less advantageous conditions than the natural one, and as the details of its compliance with a general typical mechanical design are under the control of the prosthetist, it is a logical conclusion that this should be followed in every instance, the actual conditions of each case, of course, modifying it to accord therewith.

Let us review briefly some of the characteristics of the human dental mechanism which are related to the masticatory function. It will be necessary to keep in mind the movements of which the lower jaw is capable, in order that the mutual relations of the occlusal surfaces of the teeth during the functional activities of the mechanism may be understood.

The peculiar character of the temporomandibular joints permits to the mandible a wide range of movement. There are first the movements of depression and elevation, which have been carefully investigated by Tomes and Dolamore (²). In the first of these the path pursued by the anterior end of the mandible is approximately an arc of a circle, the center of which is distant therefrom from $4\frac{1}{2}$ to 8 inches and is one-half inch below the level of the condyle. The character of this path is due to the fact that there is a sliding downward and forward of the condyle during the whole movement, except at the instant of beginning. Combined with this sliding there is a rotation of the mandible about a horizontal axis passing through the two condyles. On its return to the occlusal position the jaw pursues a path almost constantly anterior to that of opening.

The second pair of movements—those of protrusion and retraction—have been accurately described by many investigators—Luce (³), Balkwill (⁴), Constant (⁵), Champion (⁶), and others. From the occlusal position the jaw is slightly depressed to unlock the cusps, and then the mandible is carried bodily forward, the condyles moving more or less evenly downward and forward in their fossæ. It may return to the position of occlusion by a reverse of this movement.

The third movement, and the one most important from a functional standpoint, is the lateral excursion of the mandible. In this, one condyle remains in the distal part of its fossa, and the jaw rotates about an approximately vertical axis passing through this condyle, the other condyle being pulled downward, forward, and inward by the external pterygoid muscle of that side. Since it is in the return from this excursion that most of the crushing of the food is done, this movement is especially interesting in its bearing on our subject.

DETAILS OF THE OCCLUSAL SURFACES OF THE BICUSPIDS AND MOLARS.

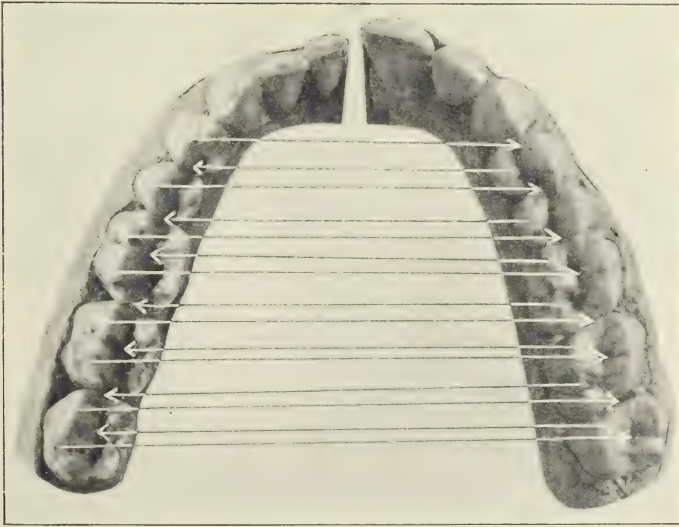
The molar and bicuspid teeth of each jaw, when viewed from their occlusal

surfaces, are seen to consist of a double series of cusps with intervening depressions or fossæ (Fig. 1). In the upper jaw the lingual cusps are blunt and rounded, with their summits nearer the center of the teeth, while the buccal cusps are sharp and thin. The reverse of this is true of the lower teeth, the inner cusps being the sharp ones and the outer being rounded. When the teeth are viewed in

teeth, it will be noted that the distance between the cusps of each row diminishes from before backward, this being due to the decrease in the size of the molar teeth. Also, the distance between the inner and outer cusps of each series decreases as we go backward.

The walls of the fossæ are formed laterally by the rows of cusps, and they are separated antero-posteriorly by the

FIG. 1.



Occlusal view of the teeth, showing cusps and the fossæ into which the latter fit.

occlusion, it will be seen that there is a definite fitting together of these cusps and fossæ, that the rounded series of cusps occupy the fossæ and depressions in the opposing teeth, and that the sharp cusps lap over the buccal and lingual surfaces of the lower and upper teeth respectively. These rounded cusps fitting in the fossæ are important from the standpoint of the crushing ability of the denture. In the upper jaw the alternation of cusps and fossæ is regular, but in the lower jaw, when the first molars, and sometimes the second and third, have five cusps, the disto-buccal cusp shares the depression in the upper series with the mesio-buccal cusp of the tooth back of it.

Returning to an occlusal view of these

marginal and triangular ridges of these surfaces.

THE CURVE OF SPEE.

When the teeth are viewed in occlusion, it will be noted that their occlusal surfaces assume the arc of a circle. (Fig. 2.) A curved line drawn touching the buccal cusps of the lower teeth will correspond more or less accurately to the arc of a circle. This line, if continued backward, either touches the anterior face of the condyle or passes posteriorly to this face. Similarly, a line drawn touching the lingual cusps of the upper molars and bicuspid touches the anterior face of the condyle or passes posteriorly to it. This is commonly called

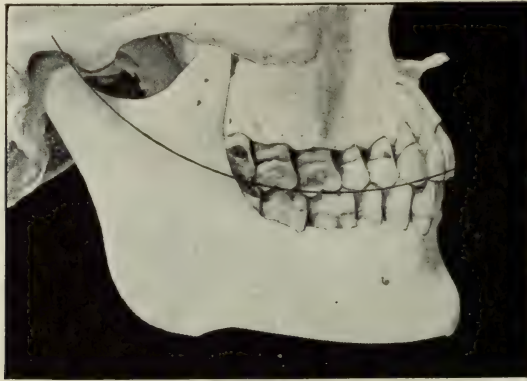
the curve of Spee. Lines of the upper buccal cusps and lower lingual cusps also more or less accurately follow a curved line concentric with the other lines mentioned. The curvature of these lines varies considerably in individuals, and has a direct relationship with the path pursued by the condyles in their downward and forward excursions. The office which this arrangement of the occlusal surface of the teeth serves is to permit a sliding contact between two series of teeth during the forward movement of the mandible. This has been carefully investigated by Spee⁽⁷⁾, Christensen⁽⁸⁾, Walker⁽⁹⁾, and others. In the

tact of the posterior teeth is broken. It is also evident that after the mandible has been elevated into the incising relation, when it is further retracted and the series of cusps come into contact with the walls of the fossæ into which they fit, this sliding contact may be preserved until the position of occlusion is reached. The significance of this characteristic will be discussed subsequently.

RELATIVE LEVEL OF BUCCAL AND LINGUAL CUSPS.

Another characteristic of the bicuspid and molar series of teeth is presented

FIG. 2.

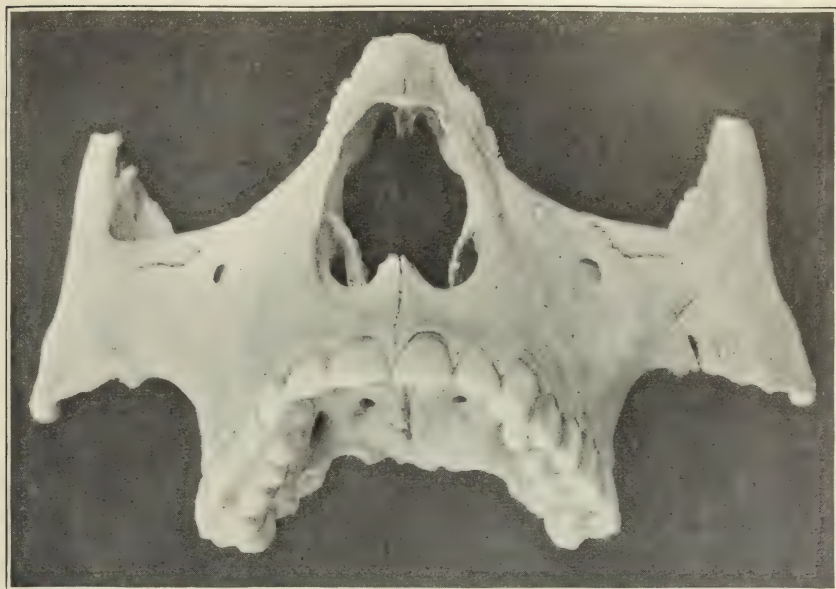


Imaginary line marking the "curve of Spee."

ideal arrangement, the curve of the occlusal surfaces passes through the anterior face of the condyle. It is evident, then, that if the teeth were devoid of cusps, a sliding contact could be maintained during a considerable portion of the forward movement of the mandible. The addition of cusps to the occlusal surfaces complicates the contact referred to, and renders more difficult our understanding of the same. However, if we can conceive of these surfaces as made up of single cusps, each sliding upon the wall of the fossa into which it fits, it is not difficult to see that the contact can be continuous in such an arrangement. In the normal denture, as soon as the lower incisors begin to slide down the lingual surface of the upper incisors, the con-

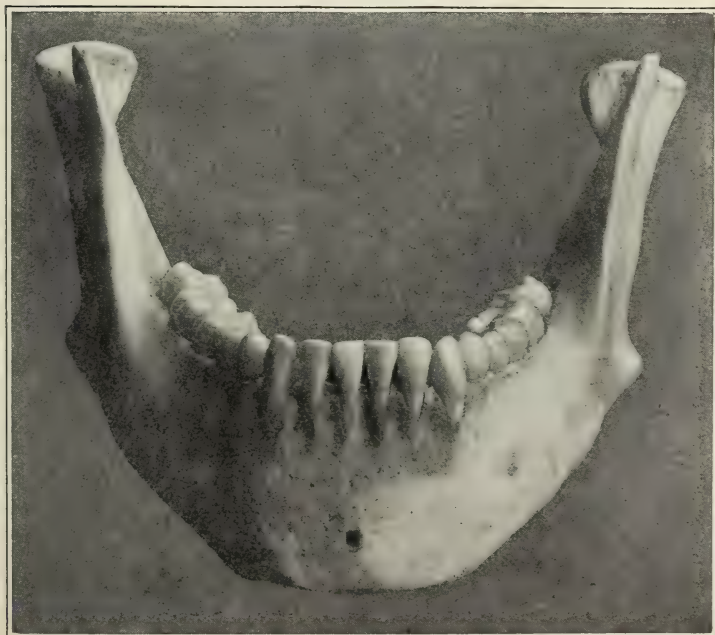
in the difference in horizontal level of their buccal and lingual cusps. (Fig. 3.) Briefly, this consists in a gradual elevation of the buccal cusps of both upper and lower series over their corresponding lingual cusps. At the position of the upper first bicuspid the buccal cusp is at a slightly lower level than the lingual, while in the second upper bicuspid the cusps are at practically the same level. With the first molar, the buccal cusps are at a higher level than the lingual, and this difference in height increases until it is very marked in the third molar. In the lower jaw there is a corresponding increase in the difference of level of the cusps from the second bicuspid backward. (Fig. 4.) This is due anatomically to the difference in the posi-

FIG. 3.



Upper teeth showing gradual elevation of the buccal cusps.

FIG. 4.



Lower teeth showing gradual elevation of the buccal cusps.

FIG. 5.



External view of the occlusal relations of the teeth.

FIG. 6.



External view of the relations of the teeth with the mandible moved to the left and the two rows of left buccal cusps in contact.

FIG. 7.



Internal view of the occlusal relations of the teeth.

FIG. 8.



Internal view of the relations of the teeth with the mandible moved to the right, showing the left lower buccal cusps in contact with the left upper lingual cusps.

tion of the long axes of the teeth, and to an actual difference in the height of their cusps. Walker⁽⁹⁾ has clearly pointed out the significance of this arrangement. It is related to the continuance of a sliding contact between the teeth during the lateral excursion of the mandible, and serves to maintain this contact in the following way: When the mandible is carried to the left, for instance, it rotates about an axis, approximately vertical, which passes through the left condyle. If a sliding contact be maintained between the teeth on the left side, the lower buccal cusps slide up the lingual incline of the upper buccal cusps until their summits are in contact. (Fig. 6.) This occurs also with the lingual cusps of that side, so that a position is attained in which the upper and lower series of cusps are in contact, both buccally and lingually. During this movement, on the right side the prominent lower buccal cusps slide up the buccal incline of the prominent upper lingual cusps, and their summits come into contact. When it is remembered that the condyle on the right side has moved downward as well as forward during this movement, it will be seen that there must be a lowering of the jaw on that side; by the difference in the relative height of the buccal and lingual cusps the contact of the cusps on both sides of the mouth at the same time is made possible. This is accomplished on the left side by the contact of a high and a low cusp of each series of cusps, while on the right side where the descent of the mandible has occurred, two high series of cusps are in contact, thus compensating for the drop on that side. In the return to the occlusal position, in which the chief crushing of food takes place, on the left side the rounded buccal cusps are drawn into the upper fossæ and against the strong lingual cusps of the upper teeth.

It must be remembered that we are concerned only with the movements of the mandible during which the teeth are in contact, and while the actual crushing of the food does not occur entirely while the teeth are in contact, still the greatest crushing stress is exerted dur-

ing the slight movement occurring after the teeth have touched until they are brought into the occlusal position.

Black⁽¹⁰⁾ has clearly demonstrated the crushing efficiency of tuberculated surfaces, and Head⁽¹¹⁾ has published the results of his investigation of the triturating movement of tuberculated surfaces. It is evident, therefore, that an ideal arrangement in which a series of a large number of tubercles fit into fossæ, acting simultaneously, is a most efficient crushing apparatus. The typical plan, then, of the human dental mechanism consists of such series of cusps or tubercles, which slide upon the walls of their fossæ during the functional movements of the apparatus, and which in the movement to the position of occlusion are made to slide into these fossæ.

Let us briefly look at the single cusp and fossa as a crushing instrument. A cusp which is accurately fitted to its fossa, both being conical in form, is a poor crushing tool, for the reason that there is no avenue of escape for the crushed material. Clearance space must be provided, and in the human denture this exists as grooves leading down to the bottoms of the fossæ into which the cusps fit. It is interesting to note that in the upper jaw these grooves are cut mainly between the buccal cusps, thus permitting the food to be forced outward and downward; in the lower jaw they are cut chiefly in the lingual cusps, the food being forced above and not below the tongue.

BONWILL'S WORK.

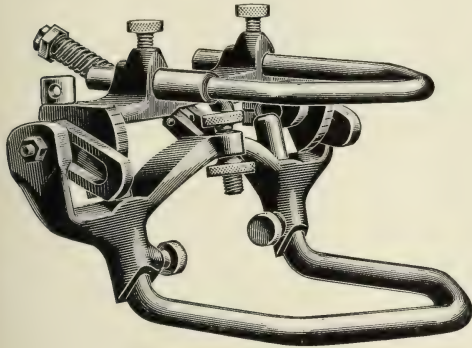
While the human dental mechanism has served most of the investigators of this question as a general model for the details of full upper and lower dentures, it is believed that it was not until Bonwill that anything like a true conception of the relations of the teeth in the lateral and forward movements of the mandible was formed. The work of Balkwill, published in the *Transactions of the Odontological Society of Great Britain* in 1865, may have antedated Bonwill's publication of this work, but it is be-

lieved that the latter had worked out his methods long before. At any rate, his conclusions were independent and original, and stand today as the most valuable work which has ever been done in this field.

His method of tooth-articulation, in which by grinding deep sulci between the outer and inner cusps of the molar and bicuspid teeth he was able to obtain a

ing the natural mechanism. Walker⁽⁹⁾ first pointed out the errors in Bonwill's work, the chief of these being the fact of the downward inclination of the condyle path, and he demonstrated the effect of this upon tooth-articulation. His articulator was made with an adjustable condyle path, and he devised for measuring this in the living subject an apparatus which, while scientifically

FIG. 9.



The Snow articulator.

deep intermeshing of the cusps, and an articulation which on his articulator balanced or preserved a sliding contact in the lateral movements, and had three points of the teeth in contact in the forward excursion, is too well known to require description. He was the first to attempt to represent in an articulator the various movements of the mandible, and while we now know that his plan of articulation was based upon a too idealistic conception of the human dental mechanism, still his pioneer work was monumental in its extent and importance. His conception of the equilateral triangle as the basis of the mechanism is not and cannot be in accord with actual anatomy, and the joint-mechanism of his articulator does not faithfully represent the condyle path even of the average case.

Various other investigators have contributed to our knowledge of artificial tooth-articulation, and this progress has been hand-in-hand with and dependent on an increase in our knowledge concern-

FIG. 10.



The Snow face-bow, by which the relation of the jaws to the temporo-mandibular joint is obtained, correctly located to secure this record.

accurate, was too complicated to come into general use.

Many others—among whom are Gritman⁽¹²⁾ and Weiss⁽¹³⁾—have designed articulators representing the condyle path as the average of that obtained from many measurements, but Walker pointed out the necessity for an instrument in which the joint mechanism could be adjusted to represent the condyle paths not only for different individuals, but for the two sides of the same individual, which, as he proved, often vary considerably. In addition to Walker's articulator, which was never put on the market, at the present time those designed by Kerr, Christensen, and Snow are characterized by this ability to individualize the con-

dyle paths. The last mentioned, by reason of its convenient mechanical construction, is especially useful. (Fig. 9.)

It is not enough that the joint-mechanism of the articulator should be capable of adjustment to the individual case, but Snow has pointed out the necessity for the placing of the casts upon the articulator in the same relations with its joint-mechanism as the jaws which they represent bear to the temporo-mandibular joint, and he has given us in the Snow face-bow⁽¹²⁾ a thoroughly satisfactory means of attaining this object. (Fig. 10.)

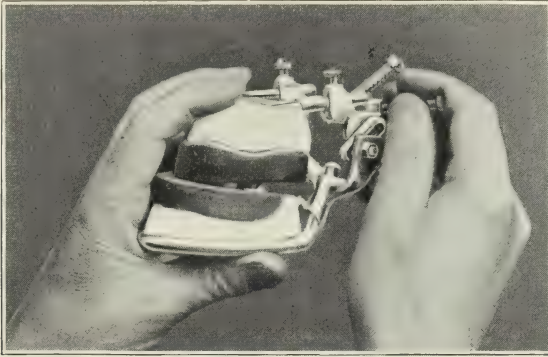
It remained for Christensen⁽⁸⁾ to propose a simple method of harmonizing the joint-path of the articulator with that of the condyle. If this method is used in conjunction with and subsequent to the correct location of the casts with the Snow face-bow, it gives the actual path of the condyles. The casts having been correctly located on the articulator, the bite-plates are returned to the patient's mouth, and instructions are given to protrude the lower jaw, and then to bring the bite-plates into contact in this protruded position. A little wax has been placed on the distal portion of the occlusal surface of the lower bite-plate, and as in this position the distal portions of the plates are separated by the descent of the condyle, the wax serves to keep them on the alveolar ridges and unites the bite-plates, thus securing a record of the relationship of the jaws in this position. These united bite-plates are returned to the casts, the upper being fixed tightly to the upper cast, and, the lower bow of the articulator being allowed to swing free, the lower cast is fitted into the lower bite-plate, such adjustment as is necessary to do this having been made in that path of the joint-mechanism which represents the path of the condyle. In this position the part of the articulator which represents the center of the condyle occupies the same position which the center of the condyle occupied in the recorded protruded position of the mandible. (Fig. 11.) If the condyle path on the articulator is then fixed by the clamping device, the path

extends from this position back to that occupied by the condyles in the position of occlusion, a record already fixed when the casts were attached to the articulator. This gives the protruded and occlusal positions of the condyles, and the straight line extending between these two, and represented by the condyle-path device on the instrument is for all practical purposes the condyle path. While the path of the condyle is not a straight line, but is in the arc of a circle of several inches radius—varying in different cases—it must be remembered that we are only concerned with it while the teeth are in contact in their various functional activities; and as, during this contact, the condyle can at the maximum move very little more than half an inch, it is evident that a straight line can represent the path sufficiently accurately for all practical purposes. J. B. Parfit⁽¹⁴⁾ has devised an articulator in which by the insertion of pieces of sheet metal cut to follow the outlines of the condylar path as traced upon the skin of the patient, he is able to reproduce more exactly the actual path during the forward movement of the mandible.

So far none of the articulators described have been adjustable to the inter-condylar distance for each individual, all having accepted Bonwill's estimation of four inches as the average for this measurement. Cryer⁽¹⁵⁾ and various others have called attention to the variation in this distance which is observed in actual specimens, and this adjustment should be possible in articulators, though it is true that the observed variation of from $3\frac{3}{8}$ to $4\frac{1}{4}$ inches has comparatively little effect upon the articulation of artificial teeth. I have here a Walker articulator, which I constructed chiefly for experimental purposes, in which this adjustment is possible. (Fig. 12.) As it is of course impossible to measure the actual distance from center to center of the condyles in the living subject, this is approximate but is fairly accurate. The average distance from the center of the condyle to the exterior corresponds to the distance from the center of movement of the joint-mechanism to

the stud on the end, the measurement from external head to external head of the elasticity of the tissues at the temporomandibular joint cannot be repre-

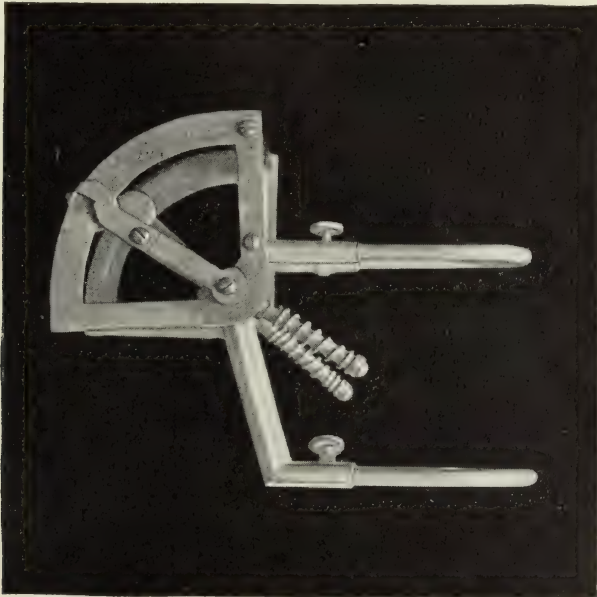
FIG. 11.



Adjusting the joint-path of the Snow articulator to the record of the condyle path obtained by means of the bite-plates.

the condyle being made with the Snow face-bow. sented, still for all practical purposes the percentage of error is too small to

FIG. 12.



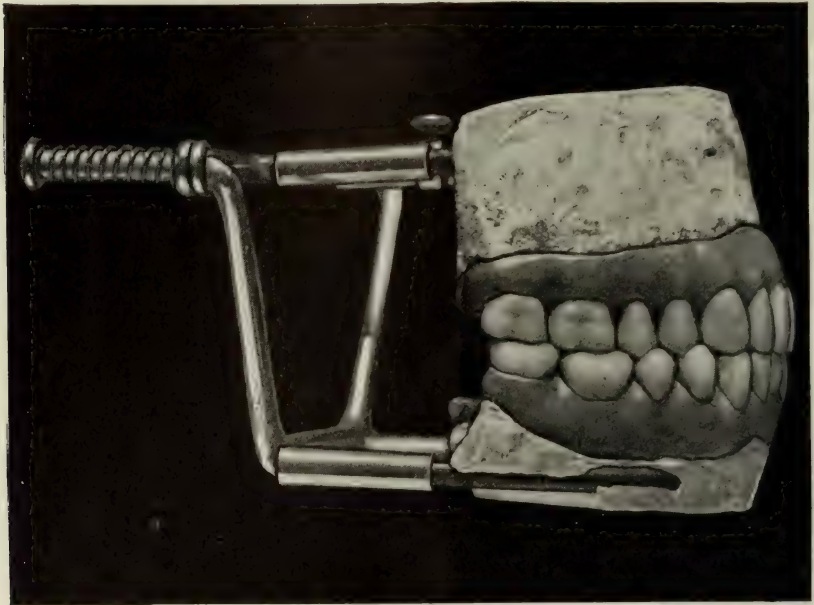
Walker articulator.

While these mechanical instruments cannot with absolute mathematical precision represent the jaw movement, as affect the result, and the slight yielding of the mucous membranes under the artificial plates compensates thoroughly for

this error. It is necessary, however, to obtain the various records, to which the

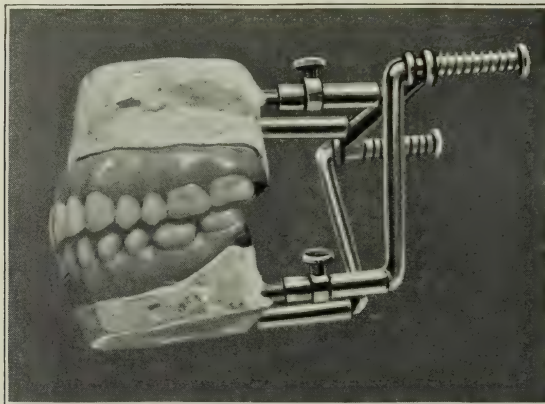
the mouth, and by testing their adjustments after the method described

FIG. 13.



Bonwill articulator and teeth articulated according to his plan. Lower bow of articulator moved to the right, showing simultaneous contact of both rows of right buccal cusps.

FIG. 14.



View of left side of Fig. 13 (reproduced on slightly smaller scale), showing contact of left lower buccal and left upper lingual cusps in the excursion of the lower bow of the articulator to the right.

articulator is set correctly, and then by a final trial of the artificial dentures in

by Weiss⁽¹³⁾ a correct result may be obtained.

TOOTH-ARTICULATION OBTAINED BY GRINDING.

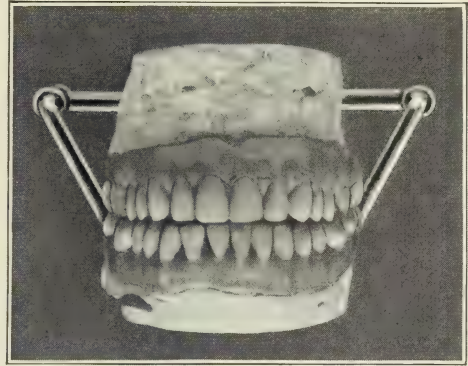
Inasmuch as artificial teeth have at no time been obtainable which corresponded to the plan of the natural teeth in an ideal denture, those who have worked along the line of their adjustment according to anatomical principles have attained the results after which they strove by grinding the teeth. Bonwill's method it is not necessary to describe. Davis⁽¹⁶⁾ and Morrison⁽¹⁷⁾ both followed the general plan of Bonwill, but their cusps were far less pronounced, and they obtained the balancing with flatter surfaces, arguing that too long cusps gave too much leverage on artificial dentures.

Weiss⁽¹³⁾ followed somewhat the same plan as these two men, having the cusps blunter and shorter than Bonwill recommended. Various others—among whom are Gritman, Walker, and Cross—have made contributions to the study of the method of grinding, so that now it is possible with our present state of knowledge to grind the occlusal surfaces of sets of teeth in such a way and to arrange them in such a manner that they carry out the general plan of the natural mechanism, and various details in this plan can be altered by the method of grinding employed to carry out any individual's ideas as to how closely the artificial should correspond to the natural in details of arrangement. Of course, individuals differ as to the details of this correspondence, and yet there must be some logical underlying principle which ought to be at the bottom of this work.

In articulating artificial teeth by the method of grinding, instead of a double row of cusps separated by fossæ, two ridges, divided here and there into cusps and separated by a groove, are obtained. In this groove is received a ridge of the opposing series. This is not as effective a mechanical arrangement as a series of fossæ and cusps, and as it also requires elaborate grinding of the teeth—often weakening them seriously—it would be better if artificial teeth could be obtained

which are in accord with a definite plan which has been demonstrated to be logical in theory and efficient in practice. Almost all prosthetists are in accord in their desire to have teeth with cusps which may be made to balance, in the lateral excursions of the mandible, exactly as described for the ideal natural denture. This principle of maintaining the dentures in place during their use, which was proposed by Bonwill, is now generally accepted. (Figs. 13 and 14.) Almost all agree upon such an arrange-

FIG. 15.



Front view of Figs. 13 and 14 with the lower bow of the articulator protruded, showing simultaneous contact of the incisors and the last molars on each side.

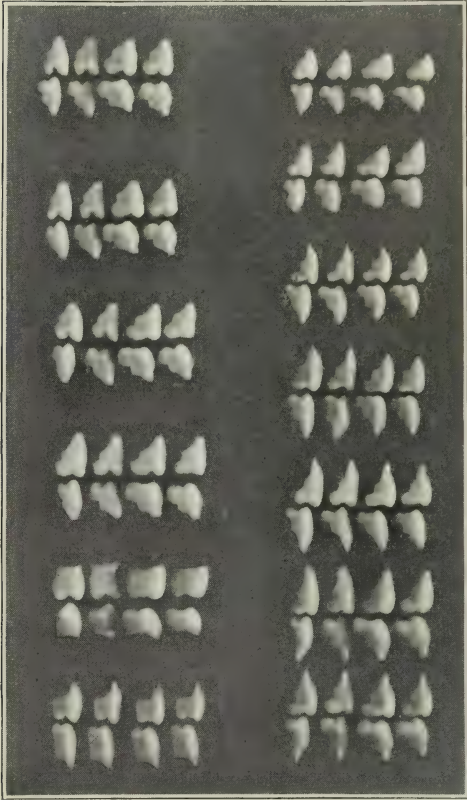
ment of the teeth that they preserve a sliding contact during the forward movement of the mandible—at least to the extent insisted upon by Bonwill, who, by making the overbite of the incisors less than in the natural teeth, arranged them so that when they were in the edge-to-edge relation for incising, there was also a point of contact between the last molars on each side. In this position the remaining teeth swing free. (Fig. 15.) It is certainly a logical conclusion that if these intervening cusps are in contact with the walls of their fossæ in this position, and can preserve a sliding contact back to the position of occlusion, a more stable and more efficient result will be obtained. The chief points of disagreement are as to the length of the cusps,

but I believe that there is a logical basis for the determination of this detail.

DEFECTS IN ARTIFICIAL TEETH AT PRESENT.

All are agreed that at present the teeth are generally too small, especially

FIG. 16.



Representative artificial upper and lower bicuspids and molars as obtained from the manufacturers.

bucco-lingually, but also mesio-distally. The cusps are too short and rounded, the fossæ too shallow and not shaped to receive the cusps. There is no correspondence between the cusps of one series and the fossæ of the other, so that the fitting of any particular cusp to its proper fossa or groove is impossible. In addition, the buccal cusps of the upper

teeth are always longer than the lingual ones, which is contrary to their anatomical proportion. (Fig. 16.)

The problem of securing artificial teeth of satisfactory form concerns both the dental profession and the manufacturer. The latter is able to construct the teeth if models for them are obtained. The porcelain bodies in use can be baked without the distortion from spheroiding and contraction, spoiling the cusps and fossæ, if allowance has been made for this in the mold. This information I have authoritatively received from the manager of one of the largest tooth-manufactories.

The details of the artificial teeth with which we are concerned in this discussion are of course only those of their occlusal surfaces, as these are the functioning surfaces. These are related to the size of the teeth as to mesio-distal and bucco-lingual diameters, the length and the positions of their cusps, the depth of the fossæ, and the relative height of their buccal and lingual cusps. As having influence on these details of the teeth we find the following factors of the jaws and temporo-mandibular joints: viz, the size and shape of the arch of the edentulous jaws, the paths of the two condyles, and the inter-condylar distance.

Let us take these up and see how they may be accommodated in the various details of the teeth.

THE SIZE OF THE TEETH.

We shall not spend much time upon the determination of the size of the occlusal surfaces of the teeth, as that is not, strictly speaking, related to the question of their articulation. Suffice it to say that, in general, at the present time those which are too short mesio-distally greatly predominate, but it is possible to select larger sizes for smaller jaws and thus get them correct in this particular. Dentists commonly select teeth which are too small in this regard. As the third molars are omitted in artificial teeth, the remaining teeth ought to be fully as large as their natural prede-

cessors were, and a good rule to follow is, after the fronts are in place and the canine located over the canine eminence, to have the second molar reach with its distal side the center of the maxillary tuberosity. The sizes of the teeth in this particular need revision chiefly by eliminating the small and increasing the large molds.

difference in length will be proportioned with a view to their establishment in that curve of Spee which is associated with the length of their cusps—a fact presently to be discussed—and any adjustment of their relative length can be made at the time of setting up by very slight grinding of their mesial and distal surfaces.

FIG. 17.



Artificial bicuspid and molars ground to articulate according to the plan of natural teeth.

The teeth are almost universally too narrow bucco-lingually in proportion to their other diameter. The idea of having smaller occlusal surfaces to compensate for the well-known diminished power of executing force exhibited by artificial dentures loses its force when one is articulating the teeth anatomically, for by this means the crushing efficiency is increased and the tendency to a displacement of the plates is diminished. Measurements of natural teeth have been made by Black, by W. R. Hall, Starr and Hise, and others, and should serve to give the correct proportions between the two diameters of the proposed new artificial molars and bicuspid. The combined mesio-distal diameters of the lower teeth will of necessity be greater than those of the upper jaw, measuring, of course, from cusp to cusp in one series, and from corresponding fossa to corresponding fossa in the other. This is because in establishing these in the curve of Spee the lower arc must be larger than the upper. For the proposed teeth this

LENGTH OF THE CUSPS.

The length of the cusps of the proposed teeth will require very careful consideration. It has been generally believed and taught that the height of the cusps in any natural denture bears a direct proportion to the amount of descent of the condyle in its path, and in consequence with the curve of Spee, which the latter determines. This conclusion is erroneous, as may be easily demonstrated by referring to Figs. 18 and 19. In these schematic drawings the amount of descent of the jaw, as caused by the downward movement of the condyle and by the depression of the jaw, is represented by the difference in horizontal level of the upper lingual and lower buccal cusps. On the other side, where the descent is due only to the depression of the jaw, it is represented by the difference in the horizontal level of the two buccal cusps or the two lingual cusps. The adjustment, in order to have contact on both sides in this movement, is made

by the relative horizontal level of the outer and inner cusps of the two sides. To show that it is not related to the length of the cusps, Fig. 18 is drawn

FIG. 18.

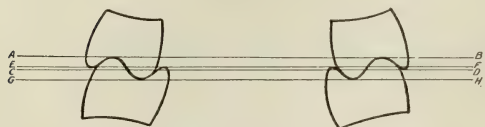


Diagram of occlusal relations of first molars with long cusps. (In the engraving the buccal cusp of the upper molar on the left should touch the line C-D.) A-B, Line of lower buccal cusps. E-F, Line of lower lingual cusps. C-D, Line of upper buccal cusps. G-H, Line of upper lingual cusps. The difference in the horizontal level of the buccal and lingual cusps of either upper or lower teeth is the same by measurement as in Fig. 19.

FIG. 19.



Diagram of occlusal relations of first molars with short cusps. The difference in horizontal level of the buccal and lingual cusps of either upper or lower teeth is the same as in Fig. 18, and the distance between the lines A-B and E-F, which is the same in both figures, represents the amount of descent of the jaw when it is carried to either side in order to have the cusps assume the relationship represented in Figs. 13 and 14.

with the same difference in level of the buccal and lingual cusps as Fig. 19, but the cusps are nearly twice as long. This is also demonstrated in these two specimens and in the case of Bonwill's, in which there are very long cusps and there is almost no descent of the condyle path. (Fig. 13.) The question of the length of the cusps, then, is mechanically independent of the mechanism according to this demonstration, and for any jaw a balancing articulation may be obtained with very long cusps or with almost flat surfaces, provided their relative horizontal level is correctly established and the other details of their arrangement are accurately carried out. There is, however, a physiological relation between the descent of the condyle path and the height of the cusps of the natural teeth, which has probably been confounded with the one just discussed. This relation, simply stated, is that flat glenoid fossæ—hence with little or no descent in the condyle path—permit more readily the lateral movements of the mandible, and in these movements teeth with long cusps do not masticate well. In nature there is usually an associated relation between flat glenoid fossæ and short cusps, and this is especially ob-

mostly the up-and-down movements, and these are associated with a marked descent of the condyle path and also a marked curve of Spee. From a functional standpoint, then, the height of the cusps should correspond to the amount of descent in the condyle path, in order that these may accord with the most efficient masticatory movements, and in all probability with what was the masticatory habit. This only must be said in addition, that the shorter the cusps the less effective they are for masticatory purposes, so that this fact sets a limit upon their shortness, and they should not be longer than the average of the longest found in the human teeth. The older the patients are and the longer they have been without teeth, generally speaking, the flatter is the floor of the glenoid fossa, and for these patients a logical balancing of the factors affecting the cusp length would assign teeth with cusps about the length of those found in a typical sanguine temperament. The longer cusps should predominate in use, as they are more efficient functionally, and if the teeth are arranged correctly according to our plan, they should not interfere in the masticatory movements. Sets of molar and bicuspid teeth with

from four to six grades of cusp lengths can answer all the requirements which we desire in this single particular.

Another detail of the length of the cusps must not be overlooked, and that is that they must be shorter as we go backward, according to Fig. 20, being proportioned in this regard to their distance from the condyle. When the mandible is depressed and moved to one side

ones which fit into the fossæ. The lower lingual cusps and the upper buccal cusps serve in this arrangement only to furnish walls to the fossæ and to be in contact with the other cusps in the lateral movement. It will be possible to construct teeth which interdigitate correctly, and then, if for a particular case it were necessary to make the inner lower and outer upper cusps shorter, this could

FIG. 20.

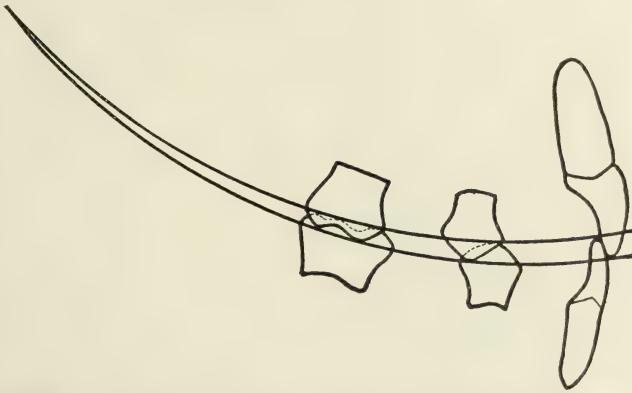


Diagram illustrating relative height of cusps and overbite in teeth articulated anatomically.

so that the summits of the cusps touch, it becomes evident why this must be mathematically correct. As in every artificial denture the distance from the condyle of any particular tooth is not fixed, yet the others are proportionally distant, and if this is determined correctly for each stock set of teeth according to their average distance from the condyle, the very slight adjustment in the relative height of the cusps would hardly require more than a touch with a stone.

RELATIVE HEIGHT OF BUCCAL AND LINGUAL CUSPS.

The next detail to arrange is the relative height of the buccal and lingual cusps. The lower buccal cusps and the upper lingual cusps are the ones which really do the crushing, they being the

ones which fit into the fossæ. The lower lingual cusps and the upper buccal cusps serve in this arrangement only to furnish walls to the fossæ and to be in contact with the other cusps in the lateral movement. It will be possible to construct teeth which interdigitate correctly, and then, if for a particular case it were necessary to make the inner lower and outer upper cusps shorter, this could

be done by grinding without affecting the adjustment of the other functioning cusps and their fossæ. Another fact must be remembered, and that is that the relative height of these cusps in any individual case can be changed by inclining the long axes of these teeth one way or the other. Our conclusions from these facts are that each series of bicuspid and molar teeth should be constructed with that difference in the horizontal level of their buccal and lingual cusps which experiments have proved to be necessary, and as determined by the height of the cusps and by the amount of descent of the condylar path with which they are usually associated. At the outside calculation this should not require more than from six to eight molds of these teeth, and good articulations could be made with four.

CLEARANCE SPACES.

Finally, the spaces cut for clearance should, as in the natural teeth, be cut from the lingual cusps below and the buccal above.

The fact that cusps are to be characteristic of the proposed teeth, instead of the ridges and grooves which exist in the ground teeth from which some of these conclusions have been reached, may seem to complicate the question, but if the ridges are divided into cusps and the fossæ filled-in to form the triangular ridges, the results are the same. The cusps slide up the walls of the fossæ in the lateral movement as did the ridges in the grooves, and in the forward movement the anterior walls of the fossæ are to be shaped simply to preserve this sliding contact.

Our conclusions are that if according to the foregoing principles twenty-five molds of teeth were constructed, the possibility of anatomical articulation will be provided for all cases with very slight alterations of the original teeth. Of course, this number will have to be enlarged to meet the mechanical demands in the way of bite and ridge-lap, but these are too elaborately provided for by the teeth on the market.

The practical result would be a lessening of the molds instead of an increase in their number, and the eighty-nine upper molds and the fifty-two lower molds of one manufacturer would be materially reduced.

Are we prepared to create the demand which will result in this state of affairs?

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A POSSIBLE PREDISPOSING CAUSE OF PYORRHEA ALVEOLARIS.

By R. MACDONALD, D.D.S.Univ.Pa., Leicester, Eng.

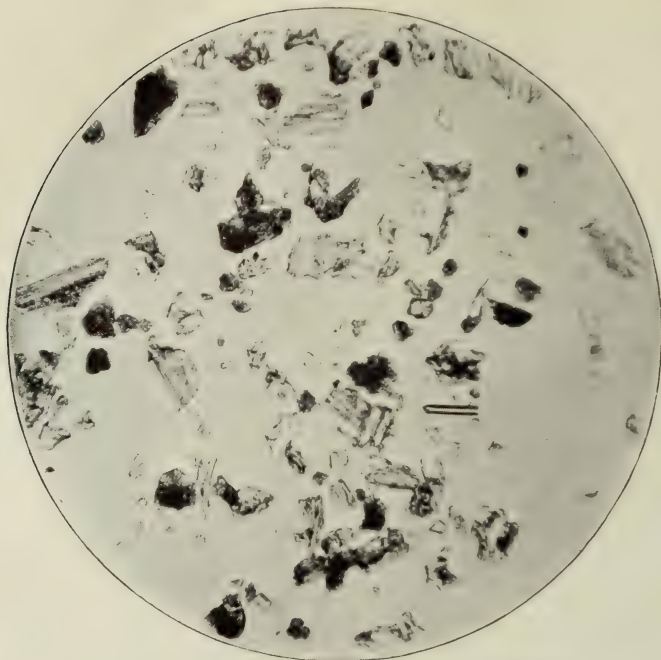
THE theory which the late Prof. W. D. Miller published in the *Cosmos*, in regard to the abrasion, erosion, and denudation of tooth tissue by the microscopic crystals contained in dentifrices, has suggested to me the possibility that the initial irritation and subsequent pathological destruction of the pericementum in pyorrhea alveolaris may be in certain instances closely associated with the same cause. Professor Miller's investigations showed that in nearly all dentifrices and pastes he found "large numbers of crystals, powdered pumice, and other undetermined insoluble grit." In precipitated chalk, the basis of so many dentifrices, he found that "the substance consists of a mass of fine crystals, which although very small are still sharp and sufficiently hard to abrade dentin." Prepared chalk he found "to contain considerable quantities of the remains of shells and other gritty substances, which make them unfit for use as tooth-powder." I respectfully submit the theory that the origin of pyorrhea in certain cases is due to gingival irritation, caused by the lodgment under the free margin of the gum and along and under the peripheral border of the pericementum itself of microscopic crystals from dentifrices. First consider the constitution of the pericementum, and also the definition of a crystal.

The pericementum is a delicate formation of fibrous connective tissue, and Tomes lays special stress on the fact that it has a rich supply of nerve fibers, and is therefore extremely susceptible to stimulus. According to Thomas, a crystal is defined as "an inorganic angular solid bounded by plane faces." Professor Miller's investigations showed that

in the vast majority of dentifrices he found an abundance of these crystals. I would refer the reader at this point to Miller's photomicrographs, Figs. 1, 2, 3, 4, and 5. These will enable him to form a vivid impression of the crystals found in nearly all dentifrices. I submit that the use of dentifrices, in conjunction with the inserting property of the brush, must occasionally cause a lodgment of some of these microscopic crystals under the free margin of the gum, and aided by the constant lateral motion of the tooth in its socket, irritation of the peripheral border of the pericementum must ensue, and in many cases these sharp microscopic crystals must effect an entrance under the peripheral edge of the pericementum.

The formation of the crystal—"an angular solid bound by plane faces"—is well calculated to effect such an entrance when aided by lateral movement of the tooth in its socket, for Miller found some of these crystals obtained from dentifrices sharp enough to scratch and cut the surface of glass. The photomicrograph in Fig. 6 shows this. The microscopic character of these crystals means that perhaps hundreds of them are working simultaneously to effect this entrance. It is therefore probable that the peripheral edge of the pericementum is irritated, cut, and detached in a greater or lesser degree from the body of the tooth (cementum). This detachment would be partly brought about by the concurrent inflammation and resulting bacteria. There would thus be not only this microscopic detachment, but a mass of foreign bodies (crystals), lying inserted under the edge of the pericementum; microscopic laceration is there-

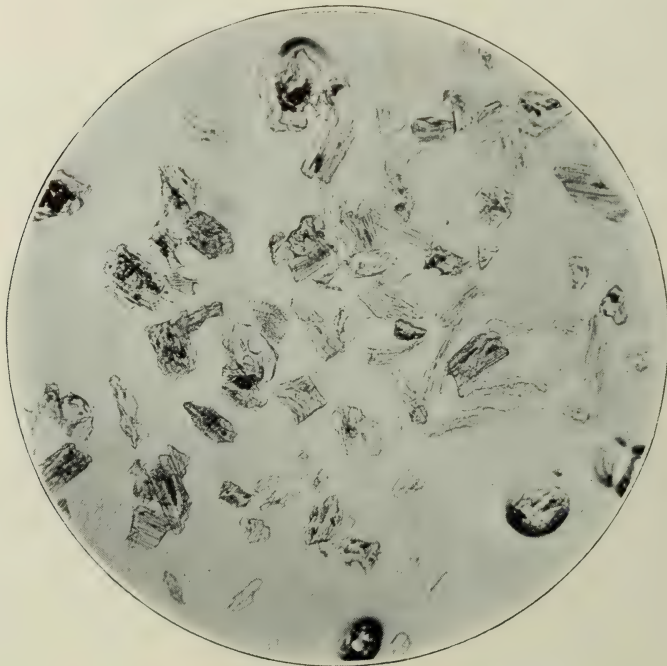
FIG. 1.



—MILLER.

Photomicrograph of sediment obtained by washing tooth-paste.

FIG. 2.



—MILLER.

Photomicrograph of powdered pumice.

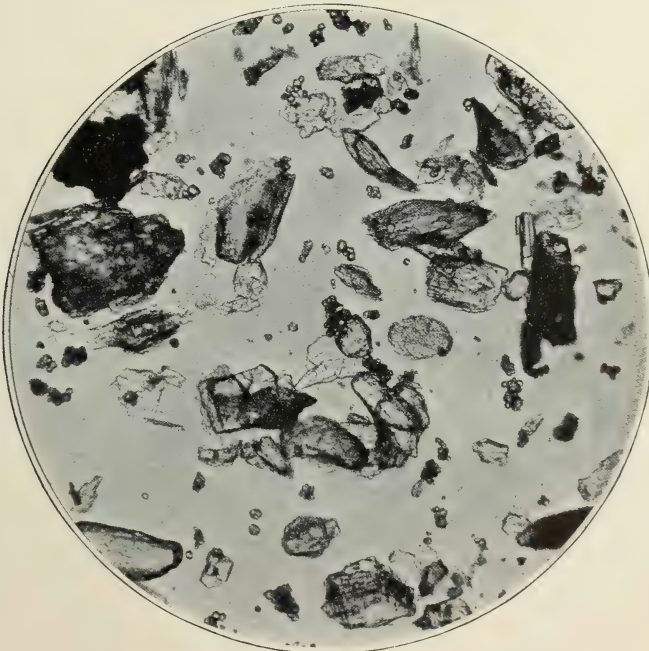
FIG. 3.



—MILLER.

Photomicrograph of a tooth-powder consisting almost wholly of powdered oyster-shell.

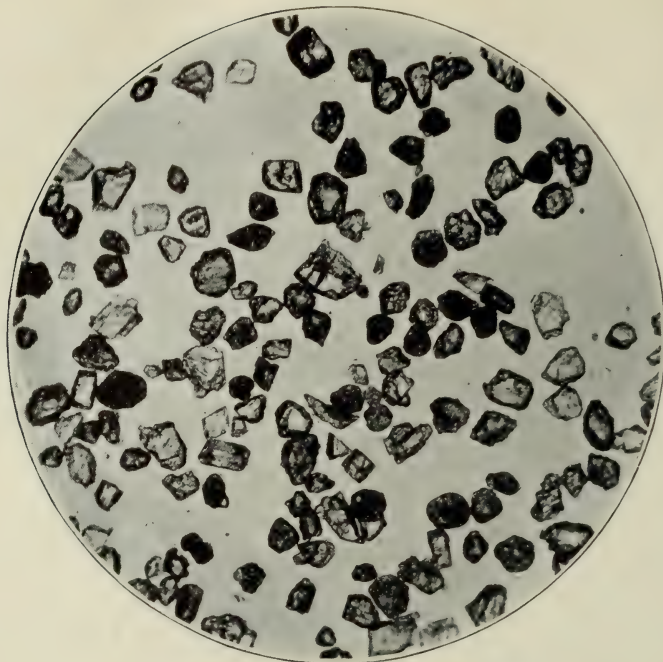
FIG. 4.



—MILLER.

Washing from a widely advertised American tooth-powder: Calcium carbonate (small crystals); larger particles not determined.

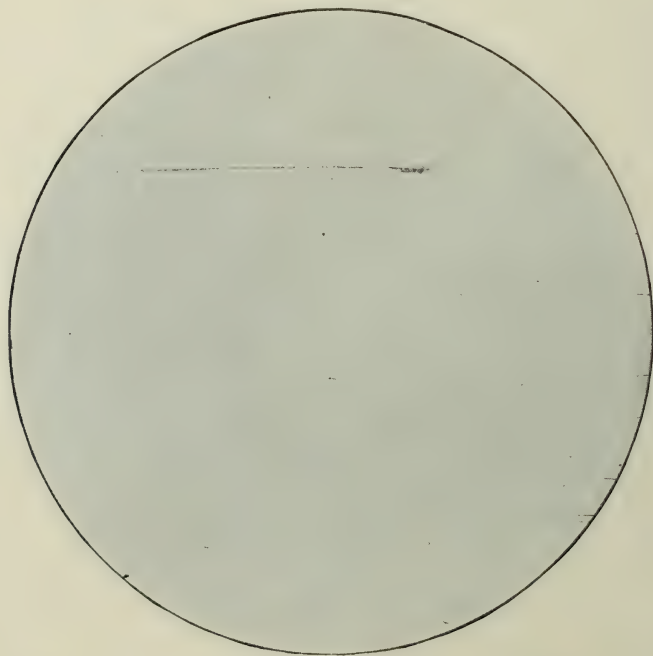
FIG. 5.



—MILLER.

Undetermined crystalline substance in a tooth-powder which had caused severe destruction of the teeth.

FIG. 6.



—MILLER.

Action of sediment from a tooth-paste containing talc, on glass.

fore likely to take place at each movement of the tooth, and where nature had designed the presence of a highly vascular cushioning body, we find its place contested by these angular solids (crystals), closely resembling broken glass when considered microscopically. Under such circumstances is it surprising that pathological changes and bacterial invasion should take place? Dr. H. C. Register and others have expressed the opinion, that gingival irritation is largely responsible for the development of most if not indeed all, cases of pyorrhea.

Having pointed out the possible presence of these crystals, and of insoluble grit under the free margins of the gums, and of their invasion of the pericemental region, I will try to illustrate a possible bearing which they might have in connection with certain cases of both pytalogenic and hematogenic pericementitis.

The predisposing cause of pytalogenic pericementitis is universally conceded to be disorders producing a subacute inflammation of the gingivæ. In this phase of pyorrhea we find subgingival deposits of calculi extending some distance on that part of the root previously covered by the pericementum. While fully recognizing tartar as a primary factor quite sufficient in itself to account for the development of pyorrhea, I believe that in many cases of pytalogenic pericementitis the initial gingivitis is not caused by the tartar, but by sharp crystals and insoluble grit lodging in the first instance under the free margin of the gum, causing slight detachment of the pericementum, the tartar representing as it were the second stage; the detachment of the peripheral edge of the pericementum and the deposit of tartar being followed by bacterial invasion, thus completing the course of the disease—pytalogenic pericementitis. In advancing this theory of traumatic irritation I beg to point out how fully I recognize the part played by the invading bacteria in the progress and maintenance of pyorrhea.

In some cases of pyorrhea there is, as is well known, no deposit of tartar at the cervical edge of the tooth, thus possibly

pointing to gingival irritation induced by some agency other than tartar.

The lodgment of crystals under the free margins of the gums and against the peripheral edge of the pericementum in different cases would cause varying degrees and phases of irritation, and consequently varying pathological developments. The degree of irritation and its subsequent manifestations would be governed by the idiosyncrasy of the patient, the histological character of the pericementum, the strength of its attachment to the cementum, and the character or power of destructiveness of the particular crystals. In one individual the peripheral edge of the pericementum may be absolutely immune to such stimulus or irritation, owing to a non-neurotic and dense external structure, while in another it may possess the delicate reflex characteristics of the conjunctiva. These points, in conjunction with a defective or perfectly formed free margin of the gum, may explain why some are affected with pyorrhea, and others escape.

As to the bearing which acute gingival irritation may have on the development of the other phase of pyorrhea—hematogenic or gouty pericementitis.

I submit in regard to its development that in many cases the initial irritation and exciting cause is gingival irritation, produced by crystals and insoluble grit lodging under the free margin of the gum along the border or edge of the pericementum, more or less inflammation resulting, but owing to the covering by the free margin of the gum, the condition is difficult to detect clinically. This would in some cases cause slight or microscopic detachment of the pericementum, and the continued peripheral irritation would, I submit, be calculated to induce a strong reflex action on the semi-apical region of the highly sensitive pericementum—that part of the pericementum where it reaches a high vascular development, and where its vessels, owing to pressure developed in biting, are subjected to great internal pressure. This reflex disturbance would be likely to induce in persons of the gouty diathesis pericemental exudation of a uratic character, with

the consequent well-known deposit on the apical area of the tooth. The presence of this uratic deposit on the root then producing further pathological changes and general bacterial invasion, loss of the tooth follows, thus completing the course of hematogenic pericementitis.

Professor Congdon of the Drexel Institute, in his investigations of this phase of pyorrhea, found that the incrustation on the apical region of the affected roots revealed the presence of crystals of uric acid, sodium urate, and calcium phosphate. These crystals have, I believe, hitherto only been considered as forming part of the characteristic apical incrustation, but it is, I think, probable that when the uratic exudation from the pericemental vessels takes place, many of these individual crystals do not attach themselves permanently to the root, but float about "vagrant-like" between the pericementum and cementum, thus acting as specific independent irritants, tending to cause inflammatory degeneration with subsequent formation of pus and bacteria. The consideration of the uratic exudation, as well as the geometric and destructive form of a crystal, whether it has its origin from a dentifrice or an exudation, prompts me to add this form of possible crystal irritation to those already mentioned in this paper.

Peirce, in Kirk's "American Text-book of Operative Dentistry," states that it is noted that many patients who have magnificent teeth, almost exempt from caries, at a period about middle life begin to have a loosening of the teeth, which sometimes leads to the loss of the entire set. This is frequently seen in teeth entirely free from tartar. In this phase of pyorrhea I submit that it may be due in some cases to (1) irritation of the peripheral border of the pericementum by crystals lodging under the free margin of the gum, thereby causing slight detachment of the pericementum with resulting inflammatory condition and bacterial invasion; or (2) this gingival irritation may excite in persons of the gouty diathesis uratic pericemental exudation, thereby giving rise to floating or vagrant crystals of uric acid, sodium urate, or

calcium phosphate, as pointed out in the preceding paragraph. Miller's investigations in regard to the pernicious character of many dentifrices lead me to express the opinion that the well-brushed teeth are the ones we should sometimes look to, not only for abrasion and denudation but for instances of pyorrhea.

The nocturnal neuralgia which Peirce mentions in the early stages of pyorrhea may be due to neurotomy—dissection of the nerves—caused by the laceration by sharp crystals of the delicate nerve fibers connecting the pericementum and cementum. It may be asked, Why do not all who use dentifrices develop pyorrhea? The answer is that some escape owing to invulnerability, as they escape other diseases.

As to the hereditary tendency to pyorrhea, it may in furtherance of this theory be explained, by a family similarity of defect in the defensive formation and character of the free margins of the gums, which would thus in each member of the family favor lodgment of crystals and other insoluble grit, and thus induce peripheral irritation of the pericementum with resulting inflammation and bacterial invasion; together with this, also, must be mentioned the characteristics of the family pericementum—*i.e.* its histological structure, its power of resistance, strength of attachment to the cementum, the tendency to tartar, the gouty diathesis, and occlusion. All of these would be more or less hereditary features, and the question of vulnerability to attack and resulting disease would be governed by them. It is obvious that the tooth-brush is particularly apt to force crystals and other insoluble grit under the free margins of the gums, both in the upper and lower jaws, and the recumbent position during sleep and lateral pressure of the tongue would favor retention of crystals and grit in the gum margins of the upper teeth. In addition to the ordinary treatment of pyorrhea, hygienic and constitutional, it is, I submit, advisable and indeed imperative to stop the use of any dentifrice containing crystals and insoluble grit.

After removing the deposits of cal-

culi from the affected teeth, I have recently made constant application of the spray, working in conjunction with the Electro Dental Company's compressed-air outfit. The strong and convincing effect of antiseptic solutions when impelled by compressed air, not only helps to render the exposed surface of the pericementum aseptic, and thus aid resolution, but it has the additional tendency to mechanically remove from the diseased surface any crystals and other undetermined insoluble grit.

It is not inconsistent with this theory that malocclusion is one of the factors of pyorrhea, because anything which imposes extra movement and strain on a tooth must necessarily aid the crystals and insoluble grit of tooth-powders in causing gingival irritation, and subsequent pathological development.

In furtherance of the theory of crystal

irritation, the fact that pyorrhea is frequently seen in dogs and other animals may be explained in some degree by the fact that they not infrequently lay their food on the earth; it is thus often charged with insoluble grit and crystals, and gingival irritation and the development of pericemental disease in the lower animals may thus in some way be explained.

Unless a dentifrice is guaranteed or known to be free from "the crystals and other undetermined insoluble grit" which Miller has demonstrated, it is the duty of dentists to awaken their patients to these pernicious properties. My purpose in writing this article is to draw attention to a possible predisposing cause of this dental disease, and to try to find a reason for its development in mouths which have always been subjected to exacting care and cleanliness.

MECHANICAL AND CHEMICAL CHANGES THAT CAN BE PRODUCED IN THE TISSUES OF THE HUMAN MOUTH.

By GEO. W. COOK, D.D.S., Chicago, Ill.

(Read before the Seventh and Eighth District Dental Societies of the State of New York, held at Rochester, November 14, 1908.)

SINCE the function of all living things must, in the last analysis, be traced to the cell, no matter whether in individual cases this function be unicellular or multicellular, normal or pathological, all functional activity must be traced to certain morphological and chemical changes that make their appearance in the cell itself.

Experience has taught that the study of physio-chemical manifestations that take place in the cell presents the most difficult biological problems known to the scientist of today. When we come to the solution of the problem of the differentiation of cells from the embryological development, and of the laws of genetic

continuity of living substance, we have really unraveled a few threads from the skein of biological phenomena. Today we are standing on the threshold of the interpretation of some of the great problems, an interpretation that will lead to a more permanent and more scientific basis for elucidating a number of phenomena, so far as external conditions can produce changes in living substance.

So far as studying the morphological and physical characteristics of the multicellular forms of life with a microscope is concerned, that field has been so scientifically covered in the early days by the classic work of Virchow and Max Schultze, who established the so-called

"cellular pathology" that stands out today as one of the great branches of biological science, that little need be said.

In the study of pathological lesions of the tissues it must be borne in mind that if abnormalities develop in the morphological appearance of cellular structure, they are the result of diminished, exalted, perverted, or abolished activities of cellular elements. The expression of these cellular changes is the result of one of two phenomena in living substance—the result of internal or external influence. In studying the pathology of tissue cells the most common manifestation of abnormality is the reversion of certain cellular activities in physical or chemical changes. We recognize that some tissue is capable of adapting itself to environing conditions so gradually that after awhile the condition may appear as normal; but the functional activity of the cell may be slightly changed so as not to produce any morphological changes.

In the external cellular structure of the human body, we have the well-known illustration of the possible adaptation of differentiated cellular structure to its environments. The outer covering, or the epithelium of the body, in certain African races, protects itself in many instances by forming, through its physiological activities, pigmentation. This pigmentation protects the body from radiation of heat, but through the adaptation the tissue becomes specially predisposed to pathological conditions that rarely occur in the same tissue of the white race. It is also well known that tissue is predisposed to the effects of certain external agents that it comes in contact with. Tissue in general, and some tissue in particular, is constantly adapting itself to external environment. The tissues of the outer portion of the body are far more adaptable to their environments than the tissues of the internal structures.

We know, for instance, that certain tissues of the body change from a normal to an abnormal functional activity by a slight change of the metabolism of that part; not that it always becomes diseased

so that there is a true pathological change, but the ascending phase of metabolism drops below a certain point of efficiency. When this has been kept up for a certain length of time its effects may change the tissue from a normal to an abnormal condition, first manifested in functional and chemical changes, and then in morphological appearance.

It is not always easy to detect these chemical changes by certain staining agents. The physical properties of cellular substance, as well as its chemical constituents, are made up of elements that combine physically, holding in combination potential energy. This energy remains in constant equilibrium with the forces that build up the structure. We recognize that tissue is an organic substance built up of elements of the simpler compounds, in a synthetic process, not only increasing the number of atoms in the molecule but increasing the number of combinations of atoms, therefore making it more unstable than some of the more simple compounds. This living organic substance is composed of three classes of compounds, known as proteids, carbohydrates, and fats. These elements or compounds are very complex bodies in themselves, but when brought in contact with each other, including organic substances, they are of such a molecular construction as to make a very unstable compound. Their physical characteristics may change in microscopical appearance under some circumstances, and in their morphological appearance they may change visibly even to the naked eye.

The microscopic change that appears with our present methods of staining tissue reveals to us the important fact that when the tissues are brought in contact with certain elementary forces, they immediately manifest a change in their physical characteristics. So it is quite impossible for us to say always just what a normal tissue should consist of physically and chemically. But we do know, with a certain degree of accuracy, that normal tissue should have a certain microscopic appearance. So the mucous membrane of the oral cavity, when brought in contact with agents like bac-

teria, will manifest a microscopic appearance very different from its original, or we might say, its normal condition.

It is thoroughly understood, I think, that all tissue is endowed with a certain amount of normal immunity, and that immunity is brought about there in individual cells through its metabolic changes. The epithelial structure of the oral cavity in infancy and childhood has but little immunity, but its constant contact with external bacterial life stimulates the internal metabolic changes to immunize that tissue against the invasion of these external exciting causes of disease. We have not yet been able to detect the chemical or physical changes that take place in cellular structure in any tissue that is predisposed, susceptible, or immune to the invasion of bacterial life. Foodstuff as it is taken into the cavity of the mouth not only affects the cells that it comes in contact with, but in many instances increases cellular activity in parts quite remote. But after this foodstuff has been in constant contact with the tissue for a certain length of time, activity in the latter begins to show a tendency to withdraw its physical activity, showing a lack of stimulation; in other words, this normal stimulus becomes an abnormal one. This can be beautifully illustrated by taking a small particle of food, meat or bread, placing it in the interproximal space, leaving it there for a few moments, removing it with small particles of the tissue, and then staining the tissue with various staining agents. One will be surprised what chemical changes will take place in the cellular structure in comparison with the normal tissue that remains in contact with particles of food for any considerable length of time. One of the most surprising results observed was that out of some sixty or more mouths only five could protect themselves from becoming immediately irritated when foodstuff and foreign agents became lodged in localities where they could rest on the mucous membrane. Not only would the mucous cells begin to degenerate, but the basement membrane, which is a fibrous tissue structure, would also begin to take on a

pathological appearance. We should bear in mind that the mucous membrane in these localities is usually composed of very long, attenuated papillæ, and when its function is in any way interfered with, the body of the cell begins to manifest the action which foreign agents have had upon it, especially if these foreign agents contain bacteria.

We understand at the present time that this is very largely the way in which caries of the teeth is produced, the foodstuffs containing a large number of bacteria that do not produce destruction of the agglutinating substance and become glued together. This is true without a doubt, and perhaps a greater number of instances of tissue degeneration of the soft parts occur than we have any conception of at the present time.

We recognize in the pathological study of various tissues that one of the most interesting problems that we have to investigate is that of the form of tissue change that takes place by over-stimulation, by the lack of a normal stimulus, or by a depressed physiological activity of localized cells. If, for instance, a weak electrical current is applied to the tissue for a little while, maybe from ten minutes to an hour, and this tissue is examined microscopically, cell proliferation can be observed. If this same electrical current is applied to the same tissue every day for the same length of time, it will be found after several days that the tissue cells are manifesting some abnormalities that we recognize at once as pathological. Take ten patients and treat them in the same way with the same current, and you will observe some individual difference in the pathological changes in each patient. This difference, however, may be so slight that it will be almost impossible to detect it in some patients, while in others it will be comparatively obvious.

The same difference of the action of various agents will be noticeable in almost any irritant that might be applied to the tissue, especially if it be a bacterial cell. The mucous membrane of the oral cavity manifests the greatest antagonistic energy against bacteria of any of the

epithelial tissues. If a celloidin sac half as large as an ordinary pea is attached to a tooth, and this sac is well inoculated with certain bacteria and allowed to remain for a few hours in this position, provided this sac rests well under the gingival margin of the gum tissue, when the tissue is removed a strong and dense wall of leucocytes and fibrin will be built up around the sac. These experiments were carried out carefully with ten different kinds of bacteria, and the variation of the protecting power of the tissue cells was so marked in some cases that it made one of the most fascinating studies that I have ever engaged in. If we take the mouth of an individual whom we consider in excellent health and whose gum tissue is well cared for—*i.e.* has had prophylactic care—the immunity of that tissue will be extraordinary in that there will not be the slightest appearance of irritation of the epithelial cell or of the mucous membrane. If, however, the tissues in the interproximal space and around the necks of teeth have been harshly dealt with by the use of pumice or one of the many tooth-powders, there will be a particular inorganic substance that will embed itself in the intercellular substance of the mucous membrane, and will act there as a focus for the collection of bacteria and dead leucocytes, and so become a source of irritation to the cells. We will then have established a degenerative focus of tissue.

Of the many agents that I have tried as mechanical irritants of the gingival tissue, the finest pulverized pumice is the most effectual. If one will study the mechanism of a mucous epithelial cell, he will easily observe how the elongated cells become wrapped around this inert substance; and unless the greatest care is used in removing these after the operation, the tissues will completely degenerate and practically all of the microscopic field of these cells will be so degenerated that it would be a marvel of nature if they were again restored to a normal condition. After some half hour's work around the gingival border of one tooth with the polishing method now in vogue, by one who is quite expert in

this class of work, we found that it took twenty minutes with a stream of tepid water to remove these particles of pumice. The pumice is quite inert upon these tissue cells as far as its chemical action is concerned, but mechanically it has the most fascinating properties for the mucous cells. Calcium phosphate, or in fact any of the calcium compounds, will act chemically, or slightly so, I may say, upon these mucous cells, but it is easily removed by a stream of water, and, in fact, if the mucous cells are not badly injured, they will rid themselves of the calcium compound. Magnesium or potassium compounds act very much in the same way as the calcium, though magnesium is a little more stimulating to the mucous cells. Potassium compounds, unless combined with calcium, are extremely poisonous to the mucous cells. All of these agents in a chemically pure state are easily removed from the mucous cells with a strong jet of water, and in this particular they differ from the pumice, in that the latter seems to form a kind of cement with the mucus.

There are many more agents that are mechanical irritants to the mucous membrane, but they have so little importance to us in the treatment of local lesions that I need not record them here. A large number of chemical agents, that we might consider as chemical irritants, were tested on the mucous membrane, and the tissues studied microscopically, revealing some phenomena interesting both as biological problems and in the treatment of the oral mucous membrane. Sodium chromate, potassium dichromate, and potassium permanganate, as well as chlorin and bromin, are all extreme protoplasmic poisons, and were but little studied on account of the impracticability of their use. Potassium chlorate when applied to the mucous tissue undergoes a change vastly different from that of permanganate, in that the potassium chlorate oxidizes dead organic matter while the permanganate does not.

It was found that the potassium chlorate in a two per cent. solution acted as a slight stimulus to the mucous cells, and decomposed many of the inorganic sub-

stances in and around the necks of teeth and under the gingival margin that were dead organic material, and could be more easily removed by this method in many cases than by mechanical means. Hydrogen dioxid has been extensively experimented with by Demoor on various unicellular organisms, and, as is commonly known, is very detrimental to this class of cell life. It also has an extremely oxidizing effect upon dead organic substance. It also affects the mucous membrane and the mucous cells in a very detrimental manner. The dioxid 1:500 would arrest the action of the epithelial cells from five to thirty minutes, and in stronger solutions, 1:200, would destroy a large number. If applied around the necks of teeth and under the gingival margin once a day for six days, the tissue would lose all of its bacterial resistance. This feature of the experiment was carried still farther, into the pockets around the necks of teeth, where pus-producing organisms were present. It caused the loss of bacterial resistance of the normal tissue and had but little or no effect on the bacteria present. In fact, a 1:500 solution of dioxid would cause cellular proliferation of the bacterial cell under anaerobic conditions. These facts are important when we consider the use of such agents in the treatment of disease conditions in and around the necks of teeth where there is a pathological lesion.

Chloroform has practically the same detrimental effects upon the mucous cells as hydrogen dioxid. A weak solution of chloroform will increase the epithelial activities for a few minutes, and if its effects are constantly applied from ten to thirty minutes it will cause the death of these cells.

The phenols, and especially the cresols that are made up in the form of soaps, also have a detrimental effect upon the mucous membrane, but these have also an inhibitory action on the growth of bacteria. A condition of biological importance worthy of consideration is that this group acts upon the bacterial cell more readily than upon the cells in higher forms of life, especially in the animal.

In summing up the important facts herein contained, we are prepared to say that the use of many agents upon the oral mucous membrane will produce mucoid degeneration of that tissue; many of them will also render the tissues less resistant to the action of bacteria. The mechanical irritations that may be produced by methods that are now in vogue in the preventative treatment of the oral mucous membrane will cause less ill effects to the tissue than any method that we have at the present time at our command. In the use of pumice for the polishing of the necks of teeth it is important that the tissue in this particular locality should be washed as thoroughly as possible with warm water before the pumice is applied, and after its use there should be an abundance of the warm water flushed upon this tissue, and the tissue thoroughly rubbed with an antiseptic gauze swab. The flushing should be continued, the parts dried, and a moment's recess taken, to see if the mucus around the gingival margin can be pressed out by a perfectly smooth orange stick. If a drop of mucus appears on the surface of the tissue a solution of Mayer's carmine made up in the following manner can be used:

Carmine,	1 gm.
Aluminum chlorid,	0.5 gm.
Distilled water,	2 cc.

Heat over a small flame for two minutes until the mixture looks dark. Then add
50 per cent. alcohol, 100 cc.

With this reagent one is able to detect normal mucus. This agent, however, will give a red appearance to any mucus, provided it is not too acid. The acid in mucin is very unstable, and very many times will disappear when left in the open air for a few moments.

Another important fact was ascertained that has clinically been observed for a long time, namely, that a mechanical or chemical agent will interfere with the chemico-physiological action of the mucous membrane for a great length of time, and will change the function of the cells so that they cannot return to a normal functional activity for some little

time; bacteria can secrete themselves, or will drop down in the vacuole of the tissue substance, and unless the tissue is possessed of considerable bacteriolytic action, they will rest there and multiply and cause a breaking down of the tissues. Such a pathological lesion is easily observed in certain forms of stomatitis, where we have ulceration of the mucous membrane, due to the lowered resistance of the tissues in general, and specially to the lowered resistance of the mucous epithelial cells. The mucous cells can no longer resist the action of the bacteria that lie within the crypts and in conjunction with the mucous epithelial cells. In such individuals, and there are many that come under our observation, our so-called prophylactic treatment might cause just the condition that we wish to avoid—tis-

sue degeneration. In the mouths of some individuals whose care has been of the ordinary sort, if one would start to rub the tissue over the canine teeth with the finger, he would find that perhaps in ten per cent. of this number the gum tissue would begin to recede and draw away from the necks of the teeth, while the other ninety per cent. would have a normal mucous membrane. The age of the patient, the general constitutional condition, as well as the local tissue, would be very important factors in determining what the result would be.

Degeneration of tissue like that of the mucous membrane is caused first by mechanical irritation, then by chemical action. The chemical agents will sometimes be the product of mechanical irritation of the tissue.

REPORT OF THE EXAMINATION OF THE MOUTHS OF 1500 SCHOOL CHILDREN IN THE PUBLIC SCHOOLS OF ANN ARBOR, MICHIGAN.

By **RUSSELL W. BUNTING, D.D.Sc., Ann Arbor, Mich.**

DURING the past few years we have been feeling the wave of enthusiasm for the dental education of our public school children which was started in Europe and has now spread to our shores. In England and Germany extensive series of examinations of school children have been carried on, and the deplorable conditions which have become apparent have led the authorities to take steps toward establishing free dental clinics, in which attention may be given to the poor who are unable to pay for the services of the dentist. It has been observed that by the carrying on of this educational work from year to year the conditions have improved, and the effort is being amply repaid. In this country the conditions are not as bad, but that dental education is needed is very evident. Wherever children and parents are aroused to the con-

ditions which are present, there is a decided awakening of their interest in the importance of their teeth and in their preservation. This educational work is but in its infancy, and if it be carried on systematically and persistently its influence will improve the hygienic conditions of our public school children, and will endow the next generation with an inheritance of better teeth and better health.

It is to be regretted that in the examinations made, but very few of the workers preserve the statistics in any permanent form, or, if they do, they fail to publish them. If all of these records could be gathered together and compiled into a usable form, such statistics would be of great value in furthering research along many different lines.

The examination of the school chil-

dren of Ann Arbor in 1906 and 1907, of which this paper is a report, was undertaken not so much for the education of the school children as for the compilation of various dental statistics in connection with anthropological measurements made upon the same children. The anthropological measurements were made by Dr. Robert Bean, who was at that time instructor in anatomy in the department of medicine and surgery, University of Michigan, and is now professor of anatomy in the Philippine Government Medical College.

Examinations were made of 1525 children, ranging in age from five to seventeen years. Two kinds of records were taken, a dental chart and an anthropological chart.

The second record consisted of the ordinary anthropological measurements of the head and face, including height, weight, color of hair and eyes, etc.

From the data thus collected we endeavored to ascertain whether or not there were any correlations between the child's physical or mental development and the time of eruption of the teeth or the amount of dental caries present; also whether the caries and the teeth-eruption were influenced by the type of the individual. For the purpose of comparison and verification, other tables were made which correspond, as far as possible, with the tables which have been made by other investigators into the time of eruption and the amount of caries at various ages.

Name..... Age.....
 Type..... Weight.....
 Color of teeth..... Height.....
 Malocclusion..... Oral hygiene.....
 Abnormalities.....

Nationality of { Father..... Occupation.....
 Mother..... Occupation.....

R m m m p p c i i i i c p p m m m
 m m c i i i i c m m L
 m m c i i i i c m m
 m m m p p c i i i i c p p m m m

Key—Erupted teeth marked with line beneath.
 Lost or extracted teeth marked by x.

Decayed teeth marked by \ drawn through.
 Erupting teeth marked by v.

Dental examination record.

The first record, as here shown, needs but little explanation. It might be said, however, that the following divisions of the "type" were made: Blondes, brunettes, intermediates, and negroes. Classification of malocclusion was made according to Angle's system.

Table I.

In this table the number of teeth erupted or erupting at each age have been grouped together and figured on a basis of percentage of each tooth erupted at specified ages. An important feature of

this chart is the wide range in the ages at which each tooth is erupted; for instance, the first molar, so often referred to as the "sixth-year molar," shows from 13 to 40 per cent. erupted or erupting at the age of five years, and yet these teeth are not all present in all cases until nine years. Emphasis should be laid on the fact that these figures are affected by

that the first molar is not present in all cases until from the ninth to the tenth year. He also shows the lower teeth as erupting earlier than the upper ones, the girls at each age being more advanced than the boys of the same age.

The age usually given for the eruption of the central incisors is from six and a half to eight years, and of the laterals

TABLE I—PERCENTAGE OF ERUPTION

AGE.	UPPER.													
	RIGHT							LEFT						
	2m	1m	2p	1p	c	i	i	i	i	c	1p	2p	1m	2m
5	..	13.3	..	..	..	..	..	..	..	..	..	..	20.0	..
5½	..	30.0	..	..	..	..	10.0	10.0	..	..	..	..	30.0	..
6	..	44.4	..	..	..	..	3.7	1.8	..	..	..	..	42.6	..
6½	..	44.4	..	..	..	..	4.4	..	..	..	..	..	44.4	..
7	..	86.3	..	..	..	3.2	30.5	33.7	2.1	..	..	..	85.0	..
7½	..	87.2	2.6	2.6	..	15.4	51.3	51.3	12.8	..	2.6	..	87.2	..
8	..	94.4	..	3.9	..	22.8	74.3	74.3	19.0	..	2.1	..	94.4	..
8½	..	95.9	6.3	4.2	..	43.7	83.3	83.3	32.1	..	4.2	..	95.9	..
9	..	100	7.5	16.1	1.1	72.0	96.8	95.7	67.7	..	12.9	5.4	100	..
9½	..	100	10.0	28.3	3.3	73.3	96.6	98.3	73.3	3.3	20.0	11.6	100	..
10	..	100	18.2	41.4	15.3	85.8	95.9	95.9	85.8	9.1	41.4	25.3	100	1.0
10½	5.9	100	30.9	51.2	20.2	90.5	100	100	92.8	21.4	54.8	40.5	100	7.1
11	5.8	100	49.5	66.9	33.9	98.0	100	100	96.1	35.9	72.8	54.3	100	5.8
11½	8.8	100	53.0	79.7	51.9	98.0	100	100	98.0	50.0	83.4	62.0	100	11.4
12	34.9	100	74.8	90.3	70.9	99.0	100	100	100	68.9	94.1	81.5	100	40.8
12½	39.2	100	86.5	94.5	72.9	98.5	100	100	100	63.5	65.0	79.7	100	47.3
13	61.0	100	84.2	93.7	82.1	96.8	100	100	99.0	86.3	92.6	85.2	100	63.2
13½	76.4	100	92.7	98.2	89.1	98.2	100	100	98.2	98.2	98.2	90.9	100	76.4
14	83.2	100	97.1	100	94.2	99.0	100	100	96.1	95.2	97.1	91.3	100	87.0
14½	89.5	100	100	100	100	97.3	100	100	100	100	100	97.3	100	86.5
15	95.8	100	100	100	97.9	100	100	100	100	97.9	97.9	95.8	100	93.6
15½	91.7	100	100	100	100	100	100	100	100	100	100	100	100	91.7
16	92.3	100	100	100	100	100	100	100	100	100	100	100	100	84.6
16½	100	100	100	100	100	100	100	100	100	100	100	100	100	100
17	100	100	100	100	100	100	100	100	100	100	100	100	100	100

the occurrence of a few abnormally late eruptions, but a wide range in time is very evident, showing that the first molar does not always erupt at six years of age. It is also seen that the lower first molars are a little in advance of the upper ones.

In the DENTAL COSMOS, 1901, vol. xliii, page 360, in the report of the transactions of the Third International Dental Congress, are published the records of the examination of over 16,000 children in the public schools of Sweden, as made by Dr. Förberg of Stockholm. He shows

from eight to nine, but judging from this series the eruption was late in many of the individuals, so that all the centrals had not appeared until the age of nine and a half in the lower jaw and ten and a half in the upper. The lower laterals were erupted at eleven years, but the uppers were not present in every case until fifteen, this last estimate being affected to a considerable extent by the cases of retarded and missing upper laterals.

The age at which the bicuspid attained

100 per cent. is seen to be about the same in the upper as in the lower, *i.e.* fourteen to fourteen and a half for the first and fourteen and a half to fifteen and a half for the second bicuspid respectively, but in the examination of the percentages found in the children ranging in age between ten and fourteen it will be seen that the upper bicuspid erupt

of Förberg's examinations above referred to, and the ages correspond very closely.

Table II.

On noticing the wide range in the ages at which the teeth were erupted in the children examined, the question arose in our minds as to whether there is a prece-

OF EACH TOOTH AT VARIOUS AGES.

LOWER.														PUPILS EXAMINED.
RIGHT					LEFT									
2m	1m	2p	1p	c	i	i	i	i	c	1p	2p	1m	2m	
..	40.0	..	..	..	..	13.3	20.0	..	..	..	..	33.3	..	15
..	30.0	..	..	..	..	20.0	20.0	..	..	..	..	30.0	..	10
..	50.0	..	..	..	1.8	44.4	40.7	..	..	..	..	50.0	..	54
..	60.0	..	..	..	2.2	57.7	53.3	..	..	..	..	64.4	..	45
..	87.3	..	..	..	30.5	76.8	71.6	29.5	..	..	1	85.2	..	95
..	89.8	..	2.6	2.6	51.3	87.2	87.2	51.3	..	..	..	92.3	..	39
..	99.0	..	..	2.1	58.1	95.2	95.2	62.9	2.1	..	..	97.1	..	105
..	97.9	2.1	2.1	..	70.8	95.9	91.6	77.1	..	2.1	2.1	97.9	..	48
..	100	3.3	8.6	10.7	92.4	95.7	95.7	90.3	7.5	7.5	6.4	100	..	93
..	100	5.0	6.6	10.0	91.6	100	100	91.6	20.0	16.6	8.3	100	..	60
4.0	100	11.2	26.3	31.3	97.0	99.0	100	95.9	32.3	29.3	16.2	100	5.0	99
8.3	100	27.4	40.5	48.8	98.8	100	100	98.8	51.2	41.7	28.6	100	8.3	84
22.3	100	38.8	58.2	62.1	100	100	100	100	58.2	59.3	44.6	100	18.4	103
36.7	100	50.0	73.4	74.7	100	100	100	100	73.2	68.4	49.3	100	27.8	79
56.3	100	71.8	87.3	89.3	100	100	100	100	85.4	87.3	68.9	100	57.4	103
66.2	100	79.7	89.2	93.1	100	100	100	100	93.1	89.2	78.2	100	66.2	74
77.9	100	81.0	94.8	96.8	100	100	100	100	100	96.8	84.2	100	77.9	95
83.6	100	85.4	94.5	96.3	100	100	100	100	94.6	89.1	81.8	100	81.8	55
89.4	100	91.3	95.2	99.0	100	100	100	100	99.0	98.0	90.1	100	93.2	104
100	100	94.6	100	100	100	100	100	100	100	100	97.3	100	97.3	37
95.8	100	95.8	100	100	100	100	100	100	100	100	95.8	100	93.6	47
91.7	100	100	100	100	100	100	100	100	100	100	100	100	91.7	36
88.4	100	100	100	100	100	100	100	100	100	100	100	100	84.6	26
100	100	100	100	100	100	100	100	100	100	100	100	100	100	5
100	100	100	100	100	100	100	100	100	100	100	100	100	100	6

somewhat earlier than the lower. The upper and lower canines are both 100 per cent. at fourteen and a half, but at the earlier ages the lowers seem to be in advance of the uppers. From this it appears that the first molars and anterior teeth erupt earlier in the lower than in the upper jaw, while with the bicuspid the order is reversed. The second molars are not erupted in all cases until the age of sixteen and a half. This relation between the upper and lower jaws at the time of eruption prevails in the records

dence on the part of the girls or the boys, or whether there might be a precedence of one type of individuals over the other. In table II we have grouped together the average number of teeth erupted at each age, comparing the boys with the girls in each type. A grand average was also made, comparing all the girls with all the boys; it was necessary, however, to omit the negroes in this average, for the reason that their figures differed notably from those of the other types, and if included would have obscured the

ratio existing in the records of the white children. An examination of the total average of this chart will show that the girls at each age above five years have more teeth erupted than the boys of the same age. This ratio does not prevail among the negroes, for in many cases the boys are in advance of the girls. In comparing the various types no definite ratio is apparent, from which we might

terior teeth show a much higher percentage of caries than the corresponding teeth in the lower. The caries occurred most frequently in the occlusal surface of the first molars, both upper and lower. The bulk of approximal caries was found in the mesial and distal surfaces of the upper incisors and in the mesial surface of both upper and lower first molars. The great preponderance of the mesial

TABLE II.
NUMBER OF TEETH ERUPTED AT VARIOUS AGES.

AGE.	BLONDES.		INTERMEDIATE.		BRUNETTES.		NEGROES.		AVERAGE, OMITTING NEGROES.	
	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.
5 years.	..	..	3	1	..	3	..	2	3	1
6 "	3	4	4	2	3	3	7	5	3	3
7 "	6	8	10	8	5	8	3	2	7	8
8 "	10	11	10	9	8	10	9	10	9	10
9 "	12	12	11	13	11	13	9	12	11	13
10 "	15	21	15	17	14	16	15	14	15	18
11 "	19	21	18	23	19	21	17	10	19	22
12 "	22	25	23	25	22	26	25	22	22	25
13 "	25	26	23	26	25	27	27	26	24	26
14 "	27	27	28	28	27	27	26	28	27	27
15 "	28	28	27	28	28	28	28	28	28	28
16 "	28	28	28	28	28	28	28	28	28	28
17 "	28	28	28	28	28	28	28	28	28	28

infer that there is no relation between the time of eruption and the type of individuals.

Table III.

In all of the examinations made there were noted 2068 carious teeth, and table III was prepared in order to ascertain their distribution in the mouth. It will be seen that there are 1167 cases of caries in the lower jaw against 901 in the upper, but it is also noticed that the large amount of caries in the lower jaw is confined almost entirely to the first molars, the only other teeth affected to any extent being the second molars and the second bicuspid. In the upper jaw the first molar is less subject to caries than in the lower, but the bicuspid and the an-

caries over the distal in the molars and bicuspid may have been accentuated by the fact that distal caries was in some instances overlooked, owing to its obscure position, but in the case of first molars the mesial surface is certainly very susceptible to caries in all those cases where the second temporary molar becomes carious before it is lost. Very few cases of caries on the buccal or labial surfaces of the teeth were observed. By far too large a percentage of lower first molars had been extracted, but they, with a few upper first molars and lower second bicuspid, made up the total of the extractions.

It must be remembered that these ratios will not be the same in subjects of more advanced age, but are the conditions found between the ages of

six and sixteen, and serve only as a guide to the beginning caries.

Table IV.

The percentage of caries which appeared in each tooth at each age was figured as set forth in table IV. The

age has 70 per cent. affected, or *two* out of every *three* examined. In view of the emphasis laid upon the importance of the first molar by the orthodontist, we can readily see what havoc would be played in the mouths of these children if these carious first molars were neglected. The fact is that a large number of them

TABLE III.

DISTRIBUTION OF CARIES IN PERCENTAGE OF TOTAL CARIES EXAMINED.

		Occlusal.	Mesial.	Distal.	Buccal.	Lost.	Total.	No. Examined.			
UPPER.	RIGHT.	2m	0.48	0.05	0.00	0.00	0.53	11	446	901	
		1m	9.67	1.21	0.09	0.14	0.43	11.54			240
		2p	0.48	1.01	0.33	0.00	0.09	1.91			40
		1p	0.86	0.33	0.72	0.00	0.05	1.96			41
		c	0.00	0.00	0.09	0.14	0.00	0.23			5
		li	0.00	1.83	0.05	0.24	0.00	2.12			44
		ci	0.00	2.08	0.96	0.09	0.00	3.13			65
	LEFT.	ci	0.00	2.12	1.40	0.09	0.00	3.61	75		455
		li	0.00	1.98	0.38	0.14	0.00	2.50	52		
		c	0.00	0.09	0.09	0.05	0.00	0.23	5		
		1p	0.96	0.19	0.84	0.00	0.05	2.04	42		
		2p	0.58	0.67	0.24	0.00	0.09	1.58	33		
		1m	9.57	1.25	0.09	0.00	0.58	11.49	238		
		2m	0.43	0.05	0.00	0.00	0.00	0.48	10		
LOWER.	RIGHT.	2m	2.81	0.09	0.05	0.09	0.00	3.03	63	575	1167
		1m	17.74	2.03	0.62	0.19	2.32	22.90	474		
		2p	0.48	0.24	0.29	0.00	0.33	1.34	28		
		1p	1.45	0.00	0.00	0.00	0.05	1.50	4		
		c	0.00	0.00	0.00	0.00	0.00	0.00	0		
		li	0.00	0.05	0.00	0.00	0.00	0.05	1		
		ci	0.00	0.24	0.00	0.00	0.00	0.24	5		
	LEFT.	ci	0.00	0.19	0.05	0.00	0.00	0.24	5	592	
		li	0.00	0.05	0.00	0.00	0.00	0.05	1		
		c	0.00	0.00	0.00	0.00	0.00	0.00	0		
		1p	0.19	0.05	0.09	0.00	0.09	0.42	9		
		2p	0.48	0.09	0.14	0.00	0.53	1.24	26		
		1m	19.15	1.99	0.38	0.33	2.41	24.26	502		
		2m	2.32	0.00	0.00	0.05	0.00	2.37	49		
								2068			

first thing to be noticed is the early age at which the first molars decay in both the upper and lower jaws; in the lower right first molar, 10 per cent. of the number erupted at six years of age were found to be carious. The percentages steadily increase from year to year, until in the sixteenth year there are in the upper jaw from 35 to 40 per cent. of carious first molars, which means more than *one* in every *three* examined, and in the lower jaw the same tooth at that

were neglected, being unfilled and badly decayed, entailing a loss by extraction of 2 per cent. in the lower jaw, and $\frac{1}{2}$ per cent. in the upper. The large amount of caries found in the first molar is probably due to the unfavorable and unhygienic conditions in which it is placed from the time of its eruption until the time the bicuspid are in place, but the great destruction which the caries produces may be attributed to the fact that so many parents consider the first permanent mo-

lar a temporary tooth. It is in this respect that the public school examinations and instruction given should be the means of awakening the minds of the children and the parents to the importance of the first permanent molar,

see if there were any relation between the types and the amount of caries. The most striking thing in this table is the low figure for the negroes. There were but sixty negroes among all the children examined, and in order to obtain further

TABLE IV—PERCENTAGE OF CARIES FOUND

AGE.	UPPER.													
	RIGHT							LEFT						
	2m	1m	2p	1p	c	i	i	i	i	c	1p	2p	1m	2m
6	...	5.3	...	...	...	...	...	...	...	...	...	...	2.9	...
7	...	1.9	...	...	...	...	...	...	...	...	...	...	0.9	...
8	...	2.1	...	...	...	...	...	...	...	...	...	...	2.1	...
9	...	6.6	...	...	...	...	...	...	...	...	...	...	5.9	...
10	...	14.8	2.4	1.4	...	...	...	...	...	...	2.5	...	8.8	...
11	...	13.4	2.3	2.4	...	2.2	0.6	2.2	2.3	...	2.9	2.1	13.3	...
12	...	21.5	2.2	2.6	...	3.5	2.8	3.4	3.9	1.0	3.6	2.2	22.6	...
13	4.6	23.5	3.9	3.5	...	4.8	6.0	6.6	4.7	...	2.1	4.5	38.7	2.0
14	4.5	29.0	8.9	7.8	2.3	3.6	12.1	14.5	8.8	0.7	7.9	4.6	37.6	3.7
15	...	44.5	12.0	8.4	2.4	16.9	15.6	18.0	10.8	3.7	8.5	8.6	31.3	1.3
16	6.9	41.9	27.6	6.6	3.3	19.6	35.5	35.5	19.6	3.4	20.0	20.0	35.5	11.1

whereby many of the malocclusions which are now so prevalent can be averted.

The upper incisors show a steady increase in their percentage of caries from the eleventh to the sixteenth year, and at the latter age the centrals have the very high percentage of 35, while the laterals show about half that number. The lower incisors exhibit but little caries at any of the ages examined.

In the bicuspid's there appears to be a decided advance in the number decayed between the fifteenth and the sixteenth year, and the upper bicuspid's at all ages exhibit about twice as many cases of caries as are found in the same teeth in the lower jaw.

The canine is seldom decayed in either upper or lower jaw, but the second molar at the age of sixteen has between 20 and 30 per cent. of the total number affected by caries.

Table V.

The total percentages of caries in the various types were grouped together to

data in regard to them it was necessary to go to Detroit, where one hundred and twelve negroes and sixty-one whites were examined. In the whites 9.2 per

TABLE V.

PERCENTAGE OF CARIES IN THE VARIOUS TYPES.

TYPES.	Boys.	Girls.
Blondes	8.1	6.6
Intermediates . . .	7.5	11.7
Brunettes	7.7	9.2
Negroes	2.3	1.4
Total	4) 25.6	4) 28.9
Average	6.4	7.2

cent. of the teeth erupted were decayed, and in the negroes 6.2 per cent. Here also was a decided difference in favor of the negroes. The percentages are a little higher than in the Ann Arbor figures, on account of the fact that all of the

children examined were over ten years of age.

We also see in table V that the girls have more caries than the boys in the intermediate and brunette types, while the blonde and the negro girls have some-

Tables VI and VII.

In the comparison of tables VI and VII it is again seen that the teeth of the girls erupt somewhat earlier than those of the boys. In both sexes there

IN EACH TOOTH AT THE VARIOUS AGES.

RIGHT						LOWER.				LEFT			
2m	1m	2p	1p	c	i	i	i	i	c	1p	2p	1m	2m
.	10.4	.	.	.	.	.	.	.	.	.	.	6.2	.
.	7.1	.	.	.	.	.	.	.	.	.	.	7.9	.
.	8.0	.	.	.	.	.	.	.	.	.	.	10.1	.
.	13.7	.	.	.	.	.	.	.	.	.	.	15.7	.
.	26.8	3.3	.	.	0.6	.	.	.	.	.	5.4	33.9	.
3.4	28.9	2.7	.	.	.	.	.	.	1.9	1.2	33.2	2.2	.
3.7	42.6	3.9	.	.	.	1.1	1.1	.	1.3	4.8	41.2	6.3	.
6.4	55.0	5.0	.	.	.	.	.	.	.	3.3	47.4	3.8	.
14.5	64.5	3.3	1.5	.	.	.	.	.	.	3.9	59.6	13.6	.
19.8	60.2	2.4	2.3	.	1.2	1.2	1.2	.	2.4	3.7	61.4	16.0	.
32.1	70.9	16.6	.	.	.	3.2	3.2	.	3.3	10.0	70.9	22.2	.

what less than the boys. In the total amount of caries, the girls' teeth were more affected than the boys', probably due in part to the fact that their teeth erupt earlier.*

In the following tables—VI to XIII—the time of eruption and the amount of caries at each age are considered in respect to the anthropological measurements of the child. In the first four tables the comparison is made between the eruption and the appearance of caries in the child's teeth and his physical development. The height of the child in centimeters and the weight in grams were added together, and the sum was divided by two, which gave a mean of the child's physical growth. This mean is then used in comparison, first, with the average number of teeth erupted at each age, and second, with the average number of carious teeth in the mouths of 100 children of the same age.

* In tables III, IV, and V the percentages were figured between the number of permanent teeth erupted and the number of teeth carious or lost from caries in each individual.

are more teeth present in the individuals that are large for their age than in those that are undersized or normal, the rise being so uniform that it is evident that the development of the teeth keeps pace with the development of the body. Some children acquire their permanent teeth much in advance of the normal time, while others are very tardy; so that in the consideration of the advisability of preserving the temporary teeth in a child, the general bodily development in relation to the age should be taken into account.

Tables VIII and IX.

In considering the data concerning the caries present it is seen that the individuals that are large for their age have considerably more than those that are small, which is probably due in part to the fact that they have more teeth erupted at each age noted. But the increase in the caries of the large over that of the small children is so marked as to make it probable that there is some cause other than the presence of more teeth.

TABLE VI.

STATURE-WEIGHT IN RELATION TO ERUPTION—BOYS.
Average Number of Teeth Erupted compared with the Mean
Stature-Weight.

AGE.	MEAN HEIGHT AND WEIGHT					
	60-69	70-79	80-89	90-99	100-109	110-119
16 yrs.	. .	. .	. .	. .	28	28
15 "	. .	. .	. .	28	27.5	28
14 "	. .	. .	27	26.7	27.3	28
13 "	. .	. .	24.5	26.7	28	
12 "	. .	. .	21.8	25.3	26.5	
11 "	. .	. .	19	20.2		
10 "	. .	12.2	15.9	17.9		
9 "	. .	12	12.6			
8 "	6.8	8.4	10.5			
7 "	4.8	7.4	8.6			
6 "	2.7	3.6				
5 "	1.71					

TABLE VII.

STATURE-WEIGHT IN RELATION TO ERUPTION—GIRLS.
Average Number of Teeth Erupted compared with the Mean
Stature-Weight.

AGE.	MEAN HEIGHT AND WEIGHT					
	60-69	70-79	80-89	90-99	100-109	110-119
16 yrs.	. .	. .	. .	. .	28	
15 "	. .	. .	. .	. .	27.4	27.5
14 "	. .	. .	. .	27	27.6	27.6
13 "	. .	. .	24.8	27.1	27.6	
12 "	. .	22.2	24.2	25.9	26.1	
11 "	. .	19.4	21.3	23.3	25.6	
10 "	. .	15.9	18.3	23.5		
9 "	. .	13.1	14.7			
8 "	9.1	9.3				
7 "	6.2	9.3				
6 "	3.6	5.0				
5 "	2.9					

TABLE VIII.

STATURE-WEIGHT IN RELATION TO CARIES—BOYS.
Average Number of Carious Teeth in 100 mouths compared
with the Mean Stature-Weight.

AGE.	MEAN HEIGHT AND WEIGHT					
	60-69	70-79	80-89	90-99	100-109	110-119
16 yrs.	..	..	..	..	550	433
15 "	..	..	..	360	400	385
14 "	..	..	..	227	238	414
13 "	..	..	150	216	385	
12 "	..	..	181	178	183	
11 "	..	..	118	126		
10 "	..	50	57	133		
9 "	..	23	44			
8 "	28	31	22			
7 "	..	24				
6 "	54	17				
5 "						

TABLE IX.

STATURE-WEIGHT IN RELATION TO CARIES—GIRLS.
Average Number of Carious Teeth in 100 mouths compared
with the Mean Stature-Weight.

AGE.	MEAN HEIGHT AND WEIGHT					
	60-69	70-79	80-89	90-99	100-109	110-119
16 yrs.	..	..	..	..	475	
15 "	..	..	..	..	382	343
14 "	..	..	..	256	321	500
13 "	..	..	300	243	323	
12 "	..	..	135	157	146	
11 "	..	77	123	118	100	
10 "	..	58	136	214		
9 "	..	75	81			
8 "	13	31	12			
7 "	14	15				
6 "	13	9				
5 "	29					

It is possible that children who have a rapid growth have teeth of an inferior quality, or a certain predisposition to the girls are slightly in advance, which might be expected from their precociousness in the eruption of their teeth.

TABLE X.

BRAIN WEIGHT IN RELATION TO ERUPTION—BOYS.

Average Number of Erupted Teeth compared with the estimated Brain Weight.

AGE.	BRAIN WEIGHT IN GRAMS									
	950	1000	1050	1100	1150	1200	1250	1300	1350	1400
16 yrs.										
15 "										
14 "					26.6	25.7	27.4	27	27.4	
13 "				23.5	25	26.4	27.7	25.5	27.8	
12 "			18.4	22.2	22.7	24.9	23.4	24		
11 "			19	20.9	18.1	21.1	19.1	21.1	17.4	
10 "			14.5	15.5	15.3	16.3	15.3	19		
9 "			11.8	11.9	12.3	13.2	13.3			
8 "		9.2	10	8.2	9.5	9.5	9.7			
7 "		7.3	6.4	5.4	7.3	7.6	6.5			
6 "		1.8	3.5	3.5	2.9	2.7				
5 "										

caries, which renders them more susceptible to attack. It would be interesting to obtain further data on this point from examinations made upon other children In the comparison of the mental development of the child and the condition of the teeth, charts were made showing the relation between the estimated brain

TABLE XI.

BRAIN WEIGHT IN RELATION TO ERUPTION—GIRLS.

Average Number of Erupted Teeth compared with the estimated Brain Weight.

AGE.	BRAIN WEIGHT IN GRAMS									
	950	1000	1050	1100	1150	1200	1250	1300	1350	1400
16 yrs.										
15 "										
14 "			26.7	27.7	27.6	27	27.7			
13 "			27.3	27.1	26.9	26.2				
12 "		26.9	24.4	24.6	26.3	25.4	26			
11 "		20.1	21.6	21.5	23.5	22.9	24.7			
10 "		16.9	16.6	18.7	20	17.7				
9 "		12.1	13.4	14.8	14	14.3				
8 "	10.4	9.4	10.5	10.5	10.3					
7 "	6.3	8.2	8.6	8.5	7.8					
6 "	4.2	4.1	2.6	5.8						
5 "										

and in various parts of the country, in order to see if this relation prevails. There seems to be no marked difference between the two sexes; if there be any, weight at each age and the number of teeth erupted and decayed. The estimate of the brain weight was made by Dr. Bean from the head measurements and

computed according to an anthropological method known as "Gladstone's formula." It was hoped that there might be

dered whether it were possible that the child had developed the brain and nervous system at the expense of the teeth

TABLE XII.

BRAIN WEIGHT IN RELATION TO CARIES—BOYS.

Average Number of Carious Teeth in 100 mouths compared with the estimated Brain Weight.

AGE.	BRAIN WEIGHT IN GRAMS									
	950	1000	1050	1100	1150	1200	1250	1300	1350	1400
16 yrs.	40	530	70	550	180
15 "	..	40	..	20	30	560	390	360	380	360
14 "	..	50	..	20	160	260	190	130	360	520
13 "	120	180	320	240	110	340	..
12 "	210	180	190	190	130	120	150	230
11 "	..	230	230	130	60	90	140	170	160	20
10 "	..	10	40	50	70	70	30	50	30	20
9 "	..	30	20	20	40	20	10	60	10	..
8 "	20	..	60	20	10	10	..	10
7 "	10	..	10	..	..	30	..	..
6 "	..	20	20	..	..	20	..	..	..	..
5 "

a definite correlation in these tables, but they proved disappointing, in that the correlation, if there be any at all, was not marked enough to be definite. We

and bones; the resultant charts, however, were not constant enough to form any conclusion. It is possible that the computed brain weight was not an accurate

TABLE XIII.

BRAIN WEIGHT IN RELATION TO CARIES—GIRLS.

Average Number of Carious Teeth in 100 mouths compared with the estimated Brain Weight.

AGE.	BRAIN WEIGHT IN GRAMS									
	950	1000	1050	1100	1150	1200	1250	1300	1350	1400
16 yrs.	560	400	..	..	..	..
15 "	..	500	450	140	360	360	100	..	..	..
14 "	..	320	350	310	350	270	300	..	..	..
13 "	..	470	380	240	300	150	..	..	..	..
12 "	170	120	170	140	140	..	..	..
11 "	..	80	80	120	140	50	..	..	..	..
10 "	..	110	70	170	130	70	..	..	..	..
9 "	60	90	30	60	..	..	..	..
8 "	50	10	40	10	20	..	..	..	..	..
7 "	..	20	10	10	30	..	..	..	..	..
6 "	..	60	..	..	..	..	..	..	..	..
5 "

noticed a great many children with large heads, who were said to be very advanced mentally, and upon examining their mouths we often found them to be full of irregularities and caries. We won-

index to the mental capacity of the child, and certain it is that a number of cases of hydrocephalus crept into our records, and these would of course affect our results.

Tables X and XI.

At many of the ages, in both sexes, it will be noticed that those individuals that have a brain weight midway between the highest and lowest have the most teeth erupted, while those with very small or very large brain development are not as far advanced in regard to their teeth. This is simply an indication, and is not marked enough to be of any value unless corroborated by further statistics.

Tables XII and XIII.

There does not seem to be any definite relation, in tables XII and XIII, between the brain development and caries. If such a relation exists, it does not appear.

In all of the cases examined there were recorded 142 occurrences of malocclusions requiring treatment. Of these, 34 were of class I, 45 of class II, and 57 of class III, while 6 were being corrected.

A large number of abnormalities of various sorts were seen. There were 2 cases of supernumerary upper lateral incisors. There were also 3 cases of the upper lateral incisors being absent or retarded at fourteen and a half years, and in one case the space was closed. In 2

children at eight years of age not all of the first molars were present. In 1 case the upper second temporary molar was persistent at the age of sixteen, and 2 cases were seen that showed a retention of the upper temporary canine on one side, and the permanent canine in place of the first bicuspid, at the age of thirteen and fourteen respectively. There were 18 cases of very badly developed teeth, and between 30 and 40 cases which showed more or less pronounced pits or grooves in the incisors and bicuspids. In 15 cases there were bad pittings and extensive hypoplasia in the first molars. We also observed 3 very pronounced examples of the so-called "Hutchinson's teeth," and 7 cases of a high V arch. In 2 cases the third molar was present at the age of sixteen.

Much of this record is unsatisfactory and disappointing, but there are in it many points of interest, and it is hoped that the results may be added to similar investigations made by others, and supplemented by additional new work, until some truth of real value may be established.

I am grateful to Dr. Bean and to Dr. H. H. Harper for their able assistance in the examinations and in the compilation of these statistics.

PROGRESS OF STOMATOLOGY IN EUROPE.

By EUGENE S. TALBOT, Chicago, Ill.

THE influence of the International Association of Stomatology held in Paris, August 1, 1907, has already produced good results. This was not unexpected. Never in the history of dentistry was there such a gathering of educated, scientific men from all parts of the world. A large proportion of these representatives were sent as delegates from their respective governments or from universities which are government insti-

tutions. Of the two hundred or more delegates, many had received decorations and honors for their learning and special attainments. The influence, therefore, emanating from such a body of men could not help but be widespread.

ITALIAN INSTITUTE OF STOMATOLOGY.

From *La Revue de Stomatologie* for October 1908, and *Revue Trimestrielle*

Belge de Stomatologie for December 1908, we note the following, which is of interest to stomatologists throughout the country.

The Italian Institute of Stomatology located at 15A Via Statuto, Milan, was officially dedicated the 3d of last November. This institute was first organized and opened January 15, 1908, and occupied temporary quarters in the Clinical Institute of Milan. Together with the corps of teachers, students, and a large number of Italian stomatologists, a throng of notables of the official world, delegates from the minister of public instruction, and the common council, assisted, and several ladies of high Milan society added by their presence to the splendor of the inaugural festivities.

This is a post-graduate institution, admitting only medical graduates as students. Courses will be given by distinguished *confrères*.

But Italian stomatologists will not rest on these laurels, for already an official note announces that, beginning with October, the Italian Institute of Stomatology will increase the number of teachers. Among them we find Professor Tansini of the University of Pavia, who will have charge of a course of buccal and oral surgery.

Believing the principles of the International Association of Stomatology to be correct, our Italian *confrères* are fully prepared to stand by the aim of the Congress of Paris, which has decided buccal and oral surgery to be normally a part of the practice of the stomatologist. It is recognized, in other quarters, that if stomatologists do not practice buccal and oral surgery, the principal reason is the lack of methodical and practical education in this branch of surgery.

The instruction includes all that concerns the mouth, the tongue, the jaws and teeth, the lips, the palate, the salivary glands, adjacent structures, etc. The practice of the stomatologist is limited above by the maxillary sinus, below by the root of the tongue and the anterior part of the pharynx.

The course of buccal surgery in the Institute of Milan will include, besides theoretical and technical instruction, operative demonstrations by the teacher and practical instruction upon the cadaver and the living.

To characterize the Italian Institute of Stomatology, it is the first institute organized including a stomatologic course and following the principles advocated by the A. S. I. It is a notable fact, first of all, that the teaching corps, professors and demonstrators, without exception, as well as all the students, are and must be graduates of medicine. Second, to those without a theoretical and practical knowledge of dental clinics, operative and conservative dentistry, prothesis and orthodontia, they will give complete theoretical and practical instruction in buccal and oral surgery, hoping to produce good surgeons, operators, prothesisists, and orthodontists, and at the same time stomatologists. The illustrations published of the different departments of the infirmary show a well equipped and appointed institution.

The corps of professors and teachers are selected from the different universities throughout Italy and are men of high standing. Much credit is due to Dr. Eugenio Bellizona and Dr. Giorgio Coen-Cagli, editors of *La Stomatologia*; President C. Rovida of the Italian Society of Stomatology of Milan; the director, Prof. Carlo Platschick, and the stomatologists of Italy, for their courage and energy.

It will, then, be Italy's honor to have organized first in Europe complete instruction in buccal and oral surgery in an institution destined to produce specialists for bucco-dental affections. The course of instruction is divided into two years.

This is only a stepping-stone to what will take place in other countries of Europe. Already the influences which bore fruit in Italy are being exerted elsewhere and similar results will soon be obtained.

What is being done in America for stomatology?

METHOD OF RETAINING SUPPLIED TEETH.

By J. WRIGHT BEACH, D.D.S., Buffalo, N.Y.

(Read before the Seventh and Eighth District (N. Y.) Dental Association, at Rochester, N. Y., November 1908.)

THE remotest records of dental history indicate the efforts of ancient craftsmen to devise means of retaining various forms of pieces intended to take the place of lost teeth. Thus, you will perceive that modern bridge work, which is regarded as the acme of dental prosthesis, has a history of development which may be said to be almost prehistoric. Specimens which have been found indicate that during the middle ages a further development of this work took place which showed evidence of better comprehension of its requirements and of the means for its accomplishment. The history of the evolution of modern bridge work is not germane to the topic of this essay, for much of it lies within the memory of many of our younger practitioners. With the development of modern bridge work an era of great possibilities in the art of supplying lost teeth was inaugurated. This method is now considered by a large majority of dentists to have reached the highest stage of perfection, yet we all must acknowledge that it possesses serious defects, which in many instances cause it to fall far short of the ideal. Too well are we aware of the disastrous results of ill-fitting bands and maladjusted crowns. It is a safe statement to make that up to a very recent period not more than five per cent. of the gold crowns that have been placed have approximated a perfect restoration, and just in proportion as this deviation from the perfect is apparent, there will follow a train of pathologic conditions varying from subacute gingivitis to so-called pyorrhea. Resorption of the surrounding alveoli occurs, resulting in the

loss of the attachment, and the final chapter not infrequently closes when the forceps are applied to the center of the wabbling bridge, and a slight "twist of the wrist" separates it from the original support. Thus the tragedy of misplaced confidence culminates, and the patient is ready to receive a piece such as I am about to describe.

This consists in a method of employing the three-point contact clasp and the so-called "crib" for retaining supplied teeth. Originality is claimed only in some minor points of application, since each dentist who attempts this work must incorporate individual ideas to bring about the desired results.

The advantages to be gained in placing partial dentures by this means are freedom from the usual plate covering the hard palate, unobstructed use of the mouth without undue encumbrance, non-interference with articulate speech, avoidance of stripping the necks of the teeth of the soft tissues, and giving to the patient a piece which to all intents and purposes takes the place of bridge work, at the same time being removable and consequently sanitary. Other points in favor of this method might be enumerated, but they are apparent to every practical dentist.

Fig. 1 needs little explanation. The two saddles are connected by a double bar soldered together of half-round base-wire, gage 12, each end being anchored into the vulcanite. The span on the left extends from the canine to the third molar, the anchorage to each tooth being effected by the three-point contact clasp. The opposite span extends from the first

bicuspid clasp distally without further support. This is a practical case of more than two years' satisfactory service.

Fig. 2 presents a condition the remedying of which has perplexed the profession for many years. From the first

of clasps about the abutments at either end, while a rubber saddle supports the plain rubber teeth. The clasps are made of 13 or 14 gage half-round gold alloyed wire in two pieces, that part which is fitted to the lingual and buccal surfaces

FIG. 1.

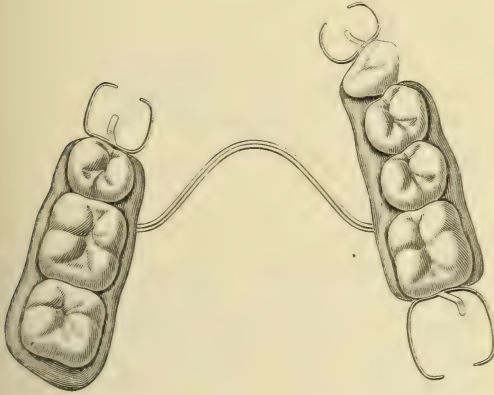
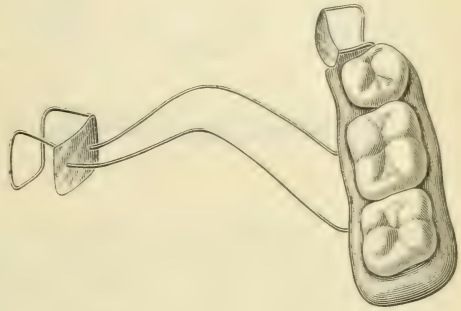


FIG. 2.



bicuspid distally no teeth are present, while on the opposite side they are intact. A crib was placed on the right first molar, two separate bars of base-wire attached to its lingual surface, carried across the palate, and anchored into the

being of one piece, and the part forming the occlusal rest or tang being soldered to the other portion.

The advantages of the method as illustrated by Figs. 3 to 8 inclusive, may be enumerated as follows: First in impor-

FIG. 3.

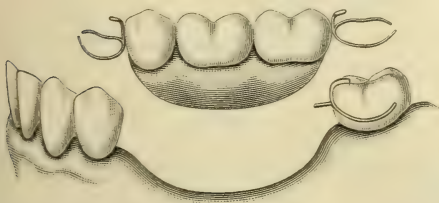
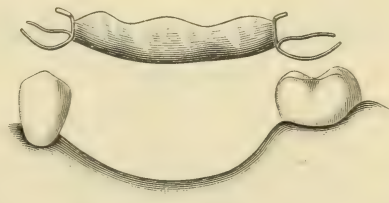


FIG. 4.



rubber saddle on the left. The other side is retained by a crib on the first bicuspid. Round wire, gage 19, is used in making the cribs. Platinum or gold plate, 30 to 36 gage, may be used for the palatal portion of the crib. For the technical method of construction, reference may be made to Dr. V. H. Jackson's work on orthodontia.

Fig. 3 shows a simple method of supplying one or more teeth by the use

tance beyond all else is the avoidance of grinding or in any way mutilating sound teeth. This fact alone, to a profession whose watchword is Conservation, should constitute sufficient logic in favor of this means to recommend its use whenever expedient. A second reason is that the piece is mainly supported by the saddle resting upon the gums. A third reason consists in its convenient removal for the purpose of cleansing, thus rendering

it sanitary, and doing away with the filthy and often disastrous conditions which not infrequently result from fixed pieces.

Someone will no doubt advance the strong argument that clasps wear the

the usual form of bridge work, not the least of which may be the patient's pocketbook. It should be employed only as an adjunct, and success comes only when the selection of cases for this work is governed by good judgment.

FIG. 5.

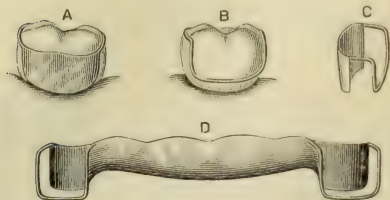


FIG. 6.



surfaces of the teeth and cause disintegration about them. To be sure this liability is present, but to a lesser extent than would naturally be expected. Experience of more than six years has satisfied me that it forms little or no objection to this method. If we compare the

Fig. 4 shows how a "biting block" may be supplied quickly, easily, and with good results. I have worn a similar piece for eight years. This form of clasp bridge is best adapted to use in the lower jaw, and the strongest point in its favor is the space underneath, which admits of

FIG. 7.

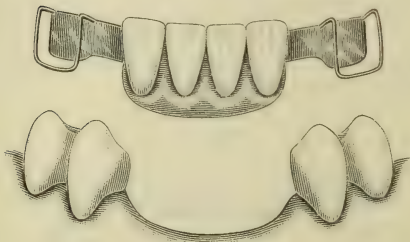
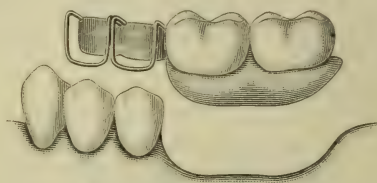


FIG. 8.



damage done by properly fitted clasps with that resulting from cemented gold bands, no better argument can be advanced in their favor. It is not intended to convey the impression that I am opposed to bridge work nor that I do not use it in my practice. Bridge work has long since been proved to be one of the grandest achievements of the dentist's art and no doubt will always retain its exalted and valuable place. This, however, does not signify that other means of supplying lost teeth have no place in our practice. There are many conditions to which this method is better adapted than

thorough cleansing and flushing at every point.

Fig. 5 represents a similar piece retained in position by means of "cribs" instead of clasps. The cribs form a more positive support, and in some cases may be cemented to the teeth in the same way as would the open-faced or jacket crown. The crib is made in two pieces, the round wire is conformed to the bucco-gingival border, and extends up over the occlusal to the lingual surface with the free ends resting upon the outer surface of the pure gold plate, which has been swaged or otherwise conformed to the lingual

surface of the abutment tooth. These pieces are then united by solder, and the swaged piece is strengthened to obtain sufficient rigidity. A, B, and C give an illustration of this procedure.

Fig. 6 is a soldered piece supplying an upper second bicuspid and first molar supported by a clasp about the first bicuspid and a crib upon the second molar. This is a very practical piece, and one which I have used in similar cases with entire satisfaction.

Fig. 7 is a practical case which has been worn since last March. The lower incisors are supported by a rubber saddle, and retained by cribs on the first bicuspids, with fitted pieces resting against the lingual surfaces of the canines. Cribs are used to better advantage upon the bicuspids and molars, which explains the reason for extending this piece to the first bicuspids. The patient had worn the usual rubber denture made for such cases, which, owing to the lack of fixation, had so exposed and irritated the necks

of the teeth on the lingual side that a state of extreme sensitiveness existed, which required a covering of copper oxyphosphate to subdue.

Fig. 8 is a thoroughly practical case which forms a solution of a very common and perplexing condition. Its mode of construction is too apparent to require detailed explanation, consisting in a double crib to retain a rubber saddle which supports the lost molars.

A number of the appliances here presented may be cemented into place with perfect safety. In this way the covered surfaces of the teeth are protected, and when desired the appliances are very easily disattached.

The ideas I have advanced will not meet with the approval of many practitioners who find it difficult to break away from radical methods, nor are they recommended except in special cases, and after due consideration of the requirements.

METAL PLATES.

By **Dr. L. P. HASKELL, Chicago, Ill.**

(Read before the union meeting of the Seventh and Eighth Dental Societies of New York, at Rochester, November 13, 1908.)

IN 1849, sixty years ago, I was engaged in the manufacture of mineral teeth carved in sections. These teeth have nearly gone out of use. Some are still employed in Boston and Philadelphia, but I do not know of their being used elsewhere.

I am not trying to advance any new theories or fads, but am simply giving an unvarnished tale of personal experience. The making of metal plates has been for many years and is today in thousands of offices practically a lost art. At the postgraduate school which I established nineteen years ago, we had among our students graduates from al-

most every college in the United States, but not ten per cent. of them have ever put a metal plate into the mouth. Why is this? One reason is because the construction of a rubber plate is so simple that a dentist prefers to make that. Another reason is that the kind of instruction the students receive in many dental schools is such that the graduate does not place sufficient confidence in himself to recommend to the patient a metal plate, especially one of gold or platinum. This is the condition of things today. In former days everything, from one tooth to a full set, was set up on a plate.

Sixty-three years ago, when I entered

an office in Boston to take up the study of dentistry, the conditions were very different from what they are today. There was only one college in existence at that time, the old Baltimore College of Dental Surgery. It was the universal opinion of dentists that a young man could prepare himself better for the practice of dentistry in the office of a good practitioner than he could in the dental college of those days, which was no doubt true then although it is not the case today. There was only one dental journal at that time—the *Dental News Letter*—published in Philadelphia, and there were no dental societies.

The dental offices of those days were closed institutions. Unless you were very well acquainted with a dentist you would not be allowed to enter his operating room while he was operating, or to enter his laboratory and see how things were done there. All was secrecy to a remarkable extent, so that a young man who would learn dentistry had to take an up-hill course. I was in the office of a practitioner for three years preparing for the practice of dentistry. We had to melt and refine our gold, roll the plate, and make our solders. There were only very small stocks of teeth sold at a drug store. The teeth were made by Alcock and later by Stockton, both of Philadelphia. A few years later the firm of Jones, White & McCurdy of Philadelphia opened a branch in Boston, but did not furnish plate or solder.

For eleven years I manufactured carved block teeth for our own use and for the profession. These were similar to the gum sections that are now used, and were carved for each individual case. The material—quartz and feldspar—was taken in the rough state, calcined and ground to fine powder, mixed in proper proportions, placed in carving models, carved, placed in the muffle, biscuitied, trimmed, fitted with pins, enameled, and baked. I considered it a day's work to carve and finish two sets of teeth.

My first experience in soldering was with an alcohol lamp and a mouth blowpipe. Later, gas was introduced, but I continued to use the mouth blowpipe in

connection with the gas until eight years ago, when compressed air came into use. I had been in practice for thirteen years when rubber was first introduced—very nearly fifty years ago—and its use for artificial dentures very quickly spread all over the world. Its use was so simple that a mere novice could make a set of teeth, and it became the stock-in-trade of many so-called dentists. A man could go into an office, receive a little instruction as to how to extract teeth and put in rubber plates, and begin immediately to practice. The result was that thousands of teeth were sacrificed because these quacks could do nothing else but put in rubber plates, and the more teeth they could extract, the better for them.

Rubber has its place. I do not condemn it, but I would say that it should never be used in the upper jaw for a permanent plate. Why? On account of its non-conductivity and retention of undue heat, causing increased absorption of the alveolar process. When rubber first came into use I adopted it in my work, and have had a peculiar experience with it—my work consisting exclusively of artificial dentures—having used metal plates for thirteen years previously. I was convinced in a few years that rubber was not the proper material for permanent upper dentures, and I claim today that at least eighty per cent. of upper jaws are practically ruined, becoming flat and ridgeless in consequence; on the lower jaw it makes no difference. The difference between the upper and lower jaw is that in the upper the plate covers a broad surface and is held in place by adhesion, so that the air does not circulate under it, thereby causing increased resorption of the alveolar process on account of undue retention of heat. The lower jaw disappears in spite of everything that we can do for it. Since the introduction of aluminum I find that there is no possible objection to the latter, which makes an excellent plate, so that there is no reason why the patient should have a rubber plate for permanent wear on the upper jaw.

To come to the practical, I shall take up the construction of metal plates. My

first point is that I use plaster in taking the impression, because then I am sure of results. If I used modeling compound, I should have to select my cases, while there is no difficulty in using plaster. In regard to the expansion of plaster, I have never found that it expands to the extent of interfering with the fit of either a rubber or metal plate. When an impression is taken, how does it expand? It cannot expand outwardly because the tray prevents. It must expand inwardly, and does not that contract the opening? When filled, the plaster expands outward, so that the model, if anything, is a little smaller than the jaw. We all differ, of course, in our opinions, but that is my opinion as to the expansion of plaster.

With regard to retention of the upper denture, every dentist knows that the center of the palate is hard, and on this the whole theory of the retention of the upper denture is based. I make no use whatever of the air-chamber or vacuum cavity, excepting in a temporary denture where the plate does not extend outside the jaw. The center of the palate is hard and does not change, so we have to take into consideration the fact that the alveolar process is giving way under rubber extensively, under metal to some extent, but not nearly as much as under rubber. Provision must be made for the settling of the alveolar process where the plate should rest, and unless this provision is made what is the result? It is only a question of time when the plate will rest on the hard center, and rock, and if you put an air-chamber there, it is only a question of time when the air-chamber will be rocking. To meet that condition I put in what I call a relief. Take thin sheet wax and extend it well up toward the ridge and as far back as possible, but the plate must extend far enough back of the relief to secure a resting-place.

Instructions are sometimes given to students, when they examine the jaw, to mark the hard and the soft portions and to scrape the impression for the hard portions and the model for the soft portions. But this scraping is a very uncertain procedure. In making a rubber

plate, of course we have to scrape the impression—or what I do is to scrape it out of the plate. Plates can be worn much farther back than is generally done. The resting-place should be on the alveolar ridge, and the soft parts need no scraping, simply making a contact. This is the only change I make in a model of any kind, no matter what the conditions are.

The next step is to prepare the model for molding by flaring it all around. In a case where there is a little undercut, raise the model a little higher in front, and flare the heel more. The model should never be lifted out of the mold; by flaring it will drop out itself, jarring the flask on the edge of the molding-box. Shellac the model and have the shellac thin enough so that it will penetrate the model and not leave a film.

I use oiled sand because it is always ready for use, and I recommend the Chase molding sand. The Bailey flask as used by colleges and dentists is too small. A proper sized molding ring is five inches in diameter and two and one-half inches deep. Throw in the sand and pack, using a small potato masher, the knob of which has been cut off. With the oiled sand, the proper molding ring, and this potato masher, you will be surprised how easily a mold can be made.

Then comes the metal die. What are the five requisites for the die metal? It must be non-shrinking; it must be hard, so as not to batter; it must be tough enough so that it will not break; it must make a smooth die, and must melt at a low temperature. We have all these requisites in Babbitt metal. I introduced this to the profession fifty-eight years ago, previously having used zinc, type-metal and tin. I know that if I have a correct plaster impression, a correct model, and a Babbitt-metal die, a plate swaged on it will fit the plaster model. If the plate fits the model, it will fit the jaw. I do not have to fit the plate with pliers and burnishers. We are told in the text-books to make sometimes two zinc dies and two counter-dies. I seldom need but one die. When there is a thin ridge I make a second die, but not a sec-

ond counter-die. It is difficult to pour pure lead on Babbitt metal, therefore I reduce the melting temperature by adding one part of tin to two of lead, and when it is melted, stir until it begins to crystallize. Occasionally we have an undercut so that we cannot easily mold; the way to overcome that is to make a core with plaster and asbestos as high as the ridge, and thicker at the base than at the top, to bevel the ends, and to thoroughly dry.

With regard to the lower jaw, I consider rubber as good as anything that can be used for either a full or a partial denture; for it makes no difference what is worn, the lower jaw disappears in spite of everything we can do for it. I have for many years called the lower jaw the problem of the dentist, and when I speak of it as a problem I mean that class of cases where there is nothing left of the ridge, and sometimes worse than that—what is left is a flexible, movable surface. Fortunately for myself, and unfortunately too, I have had twelve years' experience with a full lower denture. I published some time ago in the Chicago *Dental Review* an article entitled "Personal Experience," describing my own experience of about twelve years with a plate on such a jaw as described, and I maintain that no dentist, unless he has had the same personal experience, has the least idea of what patients in such cases have to contend with in wearing a lower denture. In this connection I may say that patients must be informed as to what they may have to experience before the lower plate will be satisfactory. I have, however, become thoroughly used to mine, and I know better how to meet such cases. A model of my own lower jaw shows no ridge. I have repeatedly asked dentists who come to my school, "Would you extend a plate down on the lingual side?" The answer is almost invariably, "Yes." What is the result? If you will pardon me for removing my own plate I will show you what happens. If I place my finger firmly a very little over the margin, holding tight, and raise my tongue, you will see that my finger is easily displaced. That is where a great

many mistakes are made; a plate extended on the lingual side in ridgeless jaws is easily displaced, not only by the muscles, but by the glands and the loose integuments. In such cases you frequently hear the patient complain of clicking, because the plate is lifted. My plate does not extend on the lingual side at all. I have found that the extension outward of a shelf at the buccal side is very useful, as it allows the cheek to hold the plate and prevent it from sliding forward. I will show you later on in my clinic how these extensions are arranged. To give you an illustration, two years ago I made a lower set of teeth for a lady whose jaw was in a very bad condition. I saw her a number of times afterward, and the plate seemed satisfactory. The next time I saw her was a few weeks ago, after she had been absent from the city for a year, and her first remark was that if she had again to go through her experience she would jump into the lake. I took the plate and arranged on it some wax extensions, returned it to place, and told her to report the next day. She returned and said that it made all the difference in the world.

I claim that ninety-eight per cent. of jaws need only the relief. There are about two per cent. of cases where the palatal surface is soft, and where this condition exists you need use no relief or air-chambers, but fit the plate snugly to the palate. I have very flat jaws in which rubber plates with air-chambers have been unsatisfactory; I have made for them continuous-gum dentures, heavy as they are, using the reliefs, that have proved satisfactory. If an air-chamber is not needed in a heavy continuous-gum denture, I should like to know where one is needed. When the plate has an air-chamber the patient has to suck to expel the air; this is the suction principle. When the reliefs are used, the patient has simply to press the plate in the mouth, and it holds by adhesion. Where there are abnormal growths in the palate the relief is required more than in any other class of cases, because when the plate rests on them it irritates.

More failures in artificial dentures are due to faulty occlusion than to any other one cause. You may have a perfectly fitting plate, fair adhesion, and the teeth may look all right, yet when the jaws close, the plate is thrown downward from behind, as the anterior teeth come in contact. Never allow the anterior teeth to come in contact under any conditions. Another reason why the anterior teeth should not occlude is because of the excessive absorption of the process in front from undue pressure, leaving a flexible ridge.

With regard to the continuous-gum denture, I would say that when Dr. John Allen's agent came to Boston to sell licenses in 1851, I purchased one, and have used that method ever since. Twelve other practitioners did the same thing, but abandoned the method within a year. Yet it remains today the only ideal artificial denture that can be placed in the mouth. When properly made it is the strongest and most durable denture. I have one patient who has worn a continuous-gum denture for forty-five years, and I have seen scores of these dentures that have been in use for twenty-five and thirty years. The continuous-gum denture is the most artistic from every point of view, and the only absolutely clean one, as there is no chance for secretions to collect between the teeth and

the gums, and between the gums and the plate. Some say that this denture is too heavy, yet I do not consider weight a factor in an upper denture. If a mouth requires it, I do not hesitate to use this work.

In the continuous-gum denture the strength lies in the metal portion, and too much pains cannot be taken in securing strong foundations. A good deal of the work which we see in the West, and which is turned out by dental laboratories, is done by inexperienced workmen, who use thin plate, No. 31 or 32 gage, without reinforcements across the heel, wirings or backings.

On the lower jaw I used to recommend in a good many cases the Watt's metal plates. The second plate I made for myself was one of that kind. After wearing the plate for a short time I went into my laboratory and leaned over to speak to a student, when the plate slipped forward, owing to its excessive weight, there being no ridge to hold it. That night as soon as I lay down, the plate slipped into the cheek. If the patient has a fair ridge, that trouble will not occur. From experience, however, I have learned something more: On the lower jaw a light rubber plate can be managed as well in all respects as a heavy plate. Weight is not needed. Patients often complain of a heavy plate on the lower jaw.

CORRESPONDENCE.

A DENTAL CHARITABLE FUND.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—Reverting to the pleasure and the pride we feel in our profession, I have been wishing that a fund might be established for the purpose of aiding unfortunate but worthy dentists and their widows and orphans.

By a very small and frugal contribution, say five or ten dollars—the price of

a subscription to a public dinner—from each of even one-fifth of the thirty-seven thousand thrifty, could not an annual income be assured, that by additional donations to the principal would be easily increased to a very substantial sum?

Very sincerely yours,

A DENTIST.

PHILADELPHIA, February 14, 1909.

PROCEEDINGS OF SOCIETIES.

SEVENTH AND EIGHTH DISTRICT DENTAL SOCIETIES OF THE STATE OF NEW YORK.

Fortieth Annual Union Convention.

THE fortieth annual union meeting of the Seventh and Eighth District Dental Societies of the State of New York was held in the Seneca Hotel, Rochester, N. Y., November 12, 13, and 14, 1908.

The meeting was called to order at 11 o'clock Thursday morning, November 12th, by Dr. Edward G. Link, Rochester, president of the Seventh District Society.

The reading of the minutes of the last meeting was dispensed with on account of the secretary not having received them from the secretary who acted at the last meeting.

The next order of business was the report of the Business Committee.

Dr. W. W. BELCHER, chairman of the committee, presented the printed program of the meeting as his report, and said that the indications were for the best meeting that had ever been held by the two societies.

Dr. LOUIS MEISBURGER, Buffalo, president of the New York State Dental Society, was next introduced, and spoke to the union convention on behalf of the New York State Society. Dr. Meisburger recalled some interesting points of history in connection with the origin of the union meetings of the Seventh and Eighth District Societies. He then spoke of the State Society, outlining some work to be attempted during the coming years; he impressed upon those present the necessity of increased membership in the local societies, and urged the co-operation of the two district societies in making the next annual meet-

ing of the State Society the most successful in its history. With regard to the educational work of the State Society, he spoke of the necessity of dentistry in the charitable and penal institutions of the state, and said that the State Society was taking steps to accomplish this desired object. Dr. Meisburger spoke of the spirit of reorganization that was pervading the profession at the present, the object being to increase the membership of the different state dental societies, and said that the question would likely be taken under consideration by the New York State Society. He also spoke of the suit which Dr. W. H. Taggart had brought against one of the members of the profession in connection with the cast gold inlay.

Dr. Meisburger's address was discussed by Drs. R. H. Hofheinz, Rochester; W. G. Ebersole, Cleveland, Ohio, and G. W. Cook, Chicago, Ill., after which the meeting adjourned until the afternoon session.

THURSDAY—*Afternoon session.*

The meeting was called to order at 3 o'clock, by Dr. W. A. White in the absence of the president.

The first order of business as announced by the chair was the reading of a paper by Dr. J. W. BEACH, Buffalo, N. Y., entitled, "A Method of Retaining Supplied Teeth."

[This paper is printed in full at page 324 of the present issue of the Cosmos.]

Discussion.

Dr. B. S. HERT, Rochester. The method described in the paper appeals to me as being one which in some cases may be of great advantage. It is superior to plate work in some particulars, and also to bridge work. To bridge work, because it can be removed and cleansed; to plate work, from the fact that it does not cover the roof of the mouth and therefore does not cause the disagreeable sensations which some people experience with plates, and also because it does not interfere with the sense of taste.

When a person loses the natural teeth they can never be replaced with anything as good as the natural teeth were. An artificial substitute causes unnatural conditions which are not present in the natural teeth, and being artificial are to that extent more or less injurious.

When Dr. Beach first referred to bridge work I thought his idea was to condemn it altogether, but later on he spoke somewhat differently. He said that only ten per cent. of crowns are perfect. I think that a very high estimate. I do not believe that more than one per cent. of them are perfect; still bridge work, after all, is a good method of restoring the teeth. We sometimes see bridges that have lasted for twenty years and are still in good condition. There is undoubtedly quite a large field for this kind of work, which I think is original with Dr. Beach, as well as for bridge work and plates, in making artificial substitutes for the lost natural teeth.

Dr. F. L. SIBLEY, Rochester. The idea of the essayist, as brought out in the paper and shown in the diagrams, appeals to me strongly. It excels, as far as I can see, ordinary bridge work. Of course, these pieces may be more successful in Dr. Beach's hands than they would be with the rest of us, and we all know the excellence of his work. With regard to the question of gold crowns not being perfect, it sometimes amuses me to see crowns that have been in the mouth for a number of years, in which a finger can almost be passed be-

tween the crown and the tooth, and still the crown seems to be doing its work and to be causing no apparent trouble at all.

I shall take a great deal of pleasure in trying to do some of this work, and if I can make it look anything like the drawings, I shall be greatly pleased with my efforts.

Dr. R. H. HOFHEINZ, Rochester. I have had my troubles with partial plates. After Dr. Jackson gave the profession the crib I adopted it, and have used it ever since to a greater or less degree, and frequently in partial lower plates where the back teeth were missing. You know the great trouble which we have in these cases with the ordinary clasp. Invariably there is a downward pressure on the soft tissues, which is almost entirely obliterated by the crib. I have often said that if Dr. Jackson had given the profession nothing else but this crib, he would have made himself immortal. I am very glad that the essayist did not condemn bridge work entirely. I agree with Dr. Hert that not more than one crown out of a hundred is perfect. I had two made in my own mouth twenty-seven years ago, and they are still as perfect as human hands can make them, but these are exceptions. If Dr. Conrad is able to make perfect crowns at all times, I extend to him my most heartfelt congratulations. I cannot, and I do not think anybody in the room can.

The essayist spoke of the fixing of the teeth by clasps. This is obviated by using the crib or the Bonwill clasp. The very fact that you are having pressure upon the masticating part of the tooth counteracts the crowding against the soft tissues, which is the case under a plate that is moving constantly. I would object to the cementing of any of these appliances. It does not seem to me as if any patient could possibly keep an artificial denture of that kind free from filth. We know how easy it is for small particles of food to become lodged in places like this [illustrating] and become putrefied. I remember the case of a patient some twenty years ago, who had had an artificial denture made abroad some six years previously; his was one of the filth-

iest mouths I had ever seen. The gentleman had never removed the denture from the time when it was made.

Referring to Fig. 1, I should advise the round wire instead of the half-round wire, because there is less chance for accumulation of food. These are the only exceptions I take to Dr. Beach's most excellent paper.

Dr. GILBERT. I have had a little experience in this class of work, especially in such cases as are shown in the essayist's Fig. 3. Several of these appliances have been worn a number of years with good satisfaction. The only difference between my method of construction and that of Dr. Beach lies in the piece of metal which extends over the occlusal surface of the tooth. I simply used a clasp. In making the clasp I used a suggestion of Dr. Messerschmidt, burnishing a thin piece of gold over the tooth and then the wire over that, and soldering the two together, which makes an excellent attachment.

Dr. BEACH (closing the discussion). There is very little more to be said in regard to work of this kind. Its advantages are apparent to you all as practical dentists, and as I said in the paper, it is very easy for the practical dentist to comprehend the requirements of any individual case. I consider this work as a sort of compromise between bridge work and plate work, which is not to be used to the extent of abuse.

The case which Dr. Hofheinz speaks of, in which the round base-wire is used, I believe to bring out an excellent idea, and one which is worthy of adoption. I have used it in a few cases with satisfactory results. As a rule, I prefer swaging the portion resting back of the anterior teeth.

Dr. HOFHEINZ. Do you allow it to rest directly against the teeth?

Dr. BEACH. Not infrequently. That depends upon the condition of the mouth.

There is one thing to be taken into consideration in speaking of perfect gold crowns, and that is the surrounding tissues, particularly the soft tissues. That to my mind is as important as the con-

sideration of the tooth itself, and in this class of work we are able at all times to keep the soft tissues under control. I certainly do not condemn bridge work, but I believe its use is becoming more limited as time goes on.

The point which Dr. Gilbert speaks of in regard to burnishing a piece of metal over the tooth, placing the clasp wire over that and soldering the two together, is a good idea, but I believe in the clasp method that we use. We do not have absolute contact with the surface of the tooth, but it is rather as indicated in the paper, the three-point contact clasp, and if we have a clasp—it is really a spring clasp—it must be adapted only to certain points, rather than to the whole surface, or it will not fulfil its object.

The next paper on the program was that by Dr. G. B. SQUIRE, Buffalo, entitled, "Management of Children and the Treatment of Their Teeth."

The next order of business was the reading of a paper by Dr. HARRISON D. BEST, Pittsburg, Pa., entitled, "Tubular Crowns."

The meeting then adjourned until 9.30 Friday morning.

FRIDAY—Morning Session.

The meeting was called to order at 10 o'clock Friday morning, November 13th, by Dr. Hofheinz, Rochester.

Dr. Hofheinz read a communication from Dr. A. J. Flanagan, Springfield, Mass., in regard to the movement to have established in Philadelphia a post-graduate school to be supported by the Evans fund.

Dr. GOBLE said that he had received a similar letter from Dr. Joseph Head of Philadelphia, and moved that a committee be appointed to draft a set of resolutions and present them to the society regarding this matter.

The motion was carried.

The chair appointed as such committee Drs. L. S. Goble, Rochester; J. W. Beach, Buffalo, and W. W. Smith, Rochester.

The next order of business was the reading of a paper by Dr. L. P. HASKELL, Chicago, Ill., entitled, "Metal Plates."

[This paper is printed in full at page 327 of the present issue of the *Cosmos*.]

Discussion.

Dr. J. H. BEEBEE, Rochester. The gnarled oak that has braved the storms of years and yet stands in vigor is an object of veneration. Youth assembles 'neath its spreading branches, gathers its fruit, and receives protection. We are assembled today for mutual advancement, improvement, and solace, to listen to one who leaves us everything to admire and nothing to forgive.

Honor, reverence, and the good repute,
That comes from faithful service as its fruit,
Be to him whom living we salute!

When I learned that I was to discuss this paper, I wrote to Dr. Haskell asking for an idea which would guide me in the discussion of the subject; he sent me a reprint of some important aphorisms applied to plate work, and covering the points that he intended to bring out. I have noted several of these aphorisms on which I would comment.

I agree with the essayist entirely with regard to the vacuum cavity. In all my plates I use what some might call an air-chamber, but which in reality is a relief for the plate. In making rubber dentures, the hard palate is almost entirely covered with a piece of tin of about No. 28 gage, which simply furnishes a relief to the plate.

I also agree with the essayist's statement with regard to scraping the model for the soft portions of the palate. As to the vulcanite plate for permanent upper dentures, the essayist is absolutely right, but unfortunately for most of us, the pocketbooks of our patients require us to use rubber plates. With regard to excessive absorption, I think that it is especially hastened by the fact that the patients have no lower molars to grind with, and they prefer to get along with

the upper teeth. Our ideas and the patients' ideas and their willingness to be instructed are different.

As to the contact of the anterior teeth, I also indorse the essayist's statement, and I like to have quite a little space between the upper and the lower anterior teeth.

With regard to the question of die metal, I dislike to differ with the essayist, but still I would say that I prefer the zinc die on account of that shrinkage which he speaks of. I may be wrong and I have not had a great deal of experience in this work, but I prefer to varnish the cast with shellac, and when that is put into the sand, the impression in the sand is a little larger than the cast, and the zinc shrinks a little to compensate for that difference. For my part, I prefer the zinc die and the lead counter-die.

As to aluminum plates, I have not used aluminum for plates for many years, for the reason that the aluminum we used to obtain was not pure, although I do not know what caused the impurities.

Dr. HASKELL. It was supposed that it had iron in it, but the aluminum which is supplied to us now is absolutely pure.

Dr. BEEBEE. I consider the retention of some two or three teeth on the upper jaw a fallacy. I advocated at one time that they should be retained, as I felt that any good sound tooth that the patient had in his mouth is worth all that I could put on, but I look at it from a different point of view now. We cannot secure quite as good adaptation and cannot have the benefit of atmospheric pressure with the teeth present. That the retention of the canines is unwise, is certainly beyond controversy.

As to the bicusps and molars being so narrow and thin, I see no reason why they should be made that way, unless it is because the majority of ladies when they come to have their teeth replaced with artificial dentures insist on small white teeth. The result is that the pins come to lie directly over the points of the lower canines, which they are apt to retain on each side, but in full dentures I do not see why the heavy portion of the tooth should not be reproduced lingually;

as this gives us a chance to make that tooth a little more prominent.

Dr. S. E. MACDOUGALL, Buffalo. I wish to take one moment to express my thanks to Dr. Haskell for his very great kindness in coming here and giving us this lecture. We have all known and admired him for a great many years, and we should feel very much complimented to have him here with us, as I am sure that we have learned a great many good points from his paper.

I have done a little prosthetic dentistry, and I agree with what the essayist has said, except in one or two little points. I understood him to say that where the canines are present, we should sacrifice these teeth. I admit that people would be more comfortable without these teeth, and possibly may get better service from their dentures, but, as you know, appearances in this world are worth something to the most of us. If you look at any person who is wearing an artificial denture with a depression at the canine portion that cannot be filled out, you notice a lack of natural appearance of the face. For my part I wish to preserve the two canines in order to preserve the symmetry of the face, as I think that to be worth something to the patient.

Dr. I. C. CURTIS, Fulton. In speaking of adding to the buccal surface of the lower denture, I should like to ask the essayist for what reason those extensions are not placed in the beginning for the retention of the lower denture?

Dr. F. E. BENNETT, St. Thomas, Canada. One reason why I came here was to hear Dr. Haskell, and I am very much pleased with the lecture he has given us.

My method of securing the cast differs a little from that of Dr. Haskell, and I should like to ask his opinion with regard to that method. I use plaster for the impression and pour the fusible metal directly into the impression. I once used the sand, but I could not get the undercuts as well as by pouring the fusible metal directly into the plaster impression.

Dr. J. H. DOWER, Syracuse. I have had some experience with metal plates

and make them at every opportunity, and not one patient for whom I made such a plate would ever go back to the rubber denture. I agree of course with Dr. Haskell in what he has said, yet there is one simple suggestion that I should like to make. After preparing the plaster model, never varnish it. I never have used the oiled sand, as I have been able to obtain good results from the wet sand. Instead of varnishing the model, I simply coat it with lycopodium, a perfectly dry powder, which allows the model to easily come away from the sand, and I prefer that to varnishing the model. I simply sprinkle it on as I would shake salt from a table salt-cellar, and allow as much of it as will to cling to the model. A fresh and slightly damp model is better for this purpose than one which has been allowed to thoroughly dry.

Dr. J. P. COLLINS, Buffalo. With regard to the continuous-gum plate, I found much difficulty in that work, because of the cracks which occur in the continuous gum, allowing the secretions to get into the cracks next to the plate. It was largely because of the difficulty in mending these cases that I have gone back to the gold plate. I would like to ask Dr. Haskell what he would do in such a case?

Dr. DOWER. There is one other point which I should like to speak of, and that is the method of bringing the die and the counter-die together. I was taught in college to use a large swaging hammer and an anvil. I have abandoned that method entirely, and use pressure such as we get in a vise. I use for that purpose the Lyon swager, which gives very good results; the cracking of models, so often resulting from the hammer, is always avoided.

Dr. A. P. BURKHART, Buffalo. The suggestions which Dr. Haskell has given us are well worthy of our consideration. When I listened to Dr. Beebe's discussion and heard him admit that he had in a large measure abandoned the use of metals in making plates because of the limitations of the pocketbooks of his patients, I came to the conclusion that he was largely in error on that point.

My experience and judgment in this matter is that it depends largely on the way in which we approach our patients in regard to certain qualities of the work. Many dentists avoid metallic work because it is easier to do rubber work, others because they prefer to do operative work. This in a measure may be a mistake. I have always contended that the dentist who is able to do vulcanite and metallic work and crown and bridge work is best equipped for general practice.

I disagree with Dr. Beebee when he says that he prefers the zinc die because it shrinks. This would be all right if the shrinkage were uniform throughout, but it is not, consequently I prefer Babbitt metal.

The point which Dr. Haskell makes as to the fitting of the upper jaw by the use of the relief is a good one. Too many dentists believe that a plate is held in position by a large air-chamber, and consequently these are placed indiscriminately. I recall the case of a patient who came to me from a distant city saying that he had had seven plates made, and that none had proved satisfactory. I asked him what the trouble was, and he said they would not stay in his mouth. I looked at his mouth, and he had the best and the finest mouth for which I have ever undertaken to make a plate. The trouble was that while he had some nicely constructed plates, large air-chambers had been placed without any consideration of the condition of the mouth. All that I did was to make a relief in the plate, and when it was placed in the mouth it was almost impossible to dislodge it.

I should especially like to ask that the essayist in closing describe to us his process of swaging an aluminum plate from start to finish.

Dr. M. F. FINLEY, Washington, D. C. It is a great pleasure for me to be here at this time, for I have a great many intimate friends in this section of the country, and it was an additional pleasure to me to see Dr. Haskell's name on the program. I have known Dr. Haskell for many years, as I was born near his

section of the country. I remember meeting him during my student days in Michigan, and appreciate the fact that he is still with us. There is no asset more valuable to the dental profession than to have a man in it who has lived a life like Dr. Haskell's, who has gone through all the stages and changes of this glorious profession, and who still lives and labors with us. I am delighted to have heard the points brought out here today, and I am sure that they will be a help to me in my future work.

I should like to support one statement made here today, and that is that pressure is better for swaging than blows, both for the sake of the metal and the die.

I came in after Dr. Haskell had been talking for some minutes, and do not know whether he referred to the making of partial plates or not, but I should like to have him give us a few suggestions on the use of clasps and their position on the teeth and on the plates. I think it would be a help to many of us to know how to place these clasps on partial dentures in order to avoid any injury of the natural teeth.

Dr. HASKELL (closing the discussion). I wish to thank the societies very heartily for the kind appreciation of my paper.

With regard to the expense of metal plates, I would say that aluminum costs so little to the dentist and the patient that the question of expense of these plates can be readily overcome with aluminum. An aluminum plate can be made almost as quickly as a rubber plate and it is much more satisfactory. But preliminary to that you must impress the patient with the necessity of abandoning the rubber plate for permanent work, and then you can very readily, in a majority of cases, secure their consent to having an aluminum plate. Sometimes patients come to me and inquire regarding the continuous-gum denture. There is a class of patients who require this work, the place of which nothing else will satisfactorily take; these are cases of short upper lips and prominent upper jaws. If a patient constantly shows the teeth, together with the gum, natural appear-

ance is desired, and in some such cases we can only reproduce these conditions completely and satisfactorily with the continuous-gum denture. I have taken many such cases and made a complete transformation of the mouth. Sometimes patients object to the price of that work. My argument then is that nothing that they wear about the person is of so great importance for their personal appearance, health, and comfort as their teeth. They usually say that they had not looked at it from that point of view, and generally they yield when you appeal to them in that way.

A MEMBER. I should like to ask how the attachment of the rubber to the aluminum is secured in making these plates?

Dr. HASKELL. It is done with a loop punch; a series of eight loops is made around the margin of the plate, and eight more on the ridge, and I find that this holds the rubber securely to the metal far better than spurring.

A MEMBER. What do you do to the edge?

Dr. HASKELL. Nothing at all; the rubber furnishes sufficient finish to the margin of the plate. Some dentists turn over the margin of the plate. Here I would answer another suggestion in regard to restoring the features. It is a rule with me that a plate should be worn as high as possible all around, but it should be, and can be, worn higher across the canine eminence than anywhere else; it should drop suddenly back of that, to leave room for the play of the muscles, and the artificial gum should be fullest over these high joints. There are few cases where much fulness can be borne over the incisors, but the plate can and should be two or three times as thick over the canine eminence as anywhere else. Another question I must answer in regard to the bicuspid. It is true that artificial canines are never shaped like the natural canine on the lingual side. They are concave, like the incisors.

As to extensions on the lower plate, I have in years past had occasion to put them on, but I could not make myself believe that much was gained thereby; yet after having had more personal ex-

perience I have found that they are very useful. With regard to placing these extensions, let me say: Do not put them down flush with the margin of the plate, because they will be lifted by the muscles; rather place them midway between the margins and the necks of the teeth.

My objection to casting in the impression is that you need a cast model to refer the plate to when swaged, because if you have a correct impression and a correct model, and a plate swaged on the Babbitt, it will fit that model snugly. When you cast in the impression you have no model to refer to. Some one might suggest that you can take two impressions. I claim, however, that it is impossible to make two impressions alike so that a plate will fit models made from both impressions, because of the displacement of small portions of the soft membranes at different points in taking the two impressions.

I mix the shellac so thin that it does not leave a film at all. Some use sandarac, but that leaves a film. I have no difficulty in dropping the model out of the mold. Sometimes, where I have an undercut, I have to jar the mold on the edge of the molding-box, but if you give the proper shape to the model, there may be an undercut, and yet it will readily drop out.

In regard to nausea of patients, I have had cases where a patient was nauseated to the extent of vomiting in taking the impression, and yet wore a plate extended well back. There is another advantage of the metal plate over the rubber plate. With the rubber plate you cannot tell how it will fit until it is finished. In making a metal plate, the first thing you do after swaging is to try it in the mouth, and if there is any inclination to nausea, tell the patient to take the plate home and to get used to it by keeping it in the mouth as long as he can. I have never had a case yet where the patient has not been able to wear a plate which was extended as far back as is necessary.

With regard to the question of pure aluminum, I would say that the aluminum I use now is made by the Aluminum Reduction Company. I buy it at their

headquarters in Chicago by the pound, at a cost of forty-five or fifty cents a pound. I simply ask for pure aluminum, No. 20 gage. To anneal hard aluminum hold it over a burner and when it is hot enough to char pine it is annealed.

The trouble about using glycerin in the sand is that the glycerin burns out. For many years I used olive oil, and then cotton-seed oil, but these, too, burn out when the metal is poured in the mold. If the oil in Chase sand burns out, I re-oil that with lard oil. The animal oils do not cake. Moreover, there is no use in sifting the sand, because it does not cake.

In repairing continuous-gum work, everything depends on the treatment of the case. I invest it in plaster and asbestos, one half-inch deep all over, then put it over a large heater and apply the heat very gradually at first, gradually increasing the heat and leaving it there for probably an hour and a half; then, after cooling, soak, and remove the investment. Then it can be finished without danger.

As to the conductivity of metals, I do not know the relative differences, but any metal is a conductor of heat, and any metal is preferable to rubber on that account.

As to the force used in swaging, I have no objection to the use of the press, but I have encountered no difficulty in swaging with the hammer. I claim that I can swage the plate as well with the hammer as with the press. I do not know how anyone could get a snugger fit than I do, even with the press.

A MEMBER. When investing, to prevent cracking, do you bring the plate to a red heat?

Dr. HASKELL. No. Formerly, when baking in a coal furnace, and later in a coke furnace, I put the case into the oven and brought the heat up very gradually, until it reached red heat. I used to think this necessary, but I no longer bring the case to a red heat, but heat it in a large burner in about an hour and a half.

In regard to partial plates, the introduction of the bridge, which is indicated in the majority of cases, has taken the

place of the partial gold plate. I used to make many, but I seldom make one now. There are cases where a nicely adjusted gold plate with properly adjusted clasps is very much better than the bridge. For instance, sometimes the dentist adjusts a bridge to piers that are somewhat loose, and what is the result? It is only a short time until the bridge and piers are lost. Clasps should never be adjusted to the plate on the plaster model. This method may be successful sometimes, but it is unsafe. Clasps should always be adjusted in the mouth, and one at a time, and then soldered. I have found this method of adjusting the clasps to be very satisfactory.

In regard to the cracking of the die, I should say that if you use Babbitt metal, the die will not crack. The proper Babbitt metal is composed of one part of copper, two parts of antimony, and eight parts of tin. All dealers in dental goods manufacture it or have it made from that formula, which I gave them years ago. I obtained the original formula when it was first introduced into this country; six parts of tin were originally used, but I added two parts of tin, because the metal was brittle. It is not safe to get the commercial Babbitt metal at a hardware store or a machine shop because, in order to cheapen it, lead is substituted for tin to some extent. It is best to get it from the dental supply houses. You can make the counter-die yourself, using five parts of lead to one part of tin.

The next order of business was the reading of a paper by Dr. G. W. Cook, Chicago, Ill., on "Mechanical and Chemical Changes that Can Be Produced in the Tissues of the Mouth."

[This paper is printed in full at page 305 of the present issue of the COSMOS.]

Discussion.

Dr. A. E. WEBSTER, Toronto, Can. With one hearing or one reading of the paper just presented it is impossible to get a true appreciation of its value. It may be years before we appreciate all that has been set forth in so few words.

Before these few pages could have been written much preparatory work must have been done. To discuss a paper which has for its basis the observation of certain phenomena or the results of a number of experiments one should have had the opportunity to go over the same ground. Not having had such an opportunity, I shall confine my remarks to those sections which strike me as being of greatest interest to the general practitioner.

The principles underlying this subject have been set forth by the author on every possible occasion. In fact, at the first reading of this paper I thought the essayist had gone out of his way to impress us with the fact that the study of the cell is the basis of study and understanding of all disease conditions. But after more careful consideration I commend him for again calling it to our attention. I might epitomize what he says in this way: All tissue changes are manifested by changes in the cells or the cellular elements. These changes may be due to an increase, diminution, perversion, or abolition of the cellular elements, but notwithstanding these changes, the cells tend to adapt themselves to their environment. One notable feature in this connection is that tissues which have adapted themselves to their changed conditions are not as resistant to irritation or infection as normal tissues. The author gives as an illustration the skin of the African. We recognize that highly specialized tissues are not resistant, *e.g.* scar tissue, after an alveolar abscess has once occurred, is often liable to a second attack. On the other hand, the skin which has been subjected to many new conditions is more resistant than the mucous membrane which has not met so many variable conditions. The author sets forth that the mucous membrane of the child is less resistant to irritants than that of the adult. It is also a fact that the cell or individual develops an immunity by a bacterial attack from which it recovers. If I understand the author correctly this is not the case in irritations from mechanical and chemical sources. This he

exemplifies by the action of foodstuffs which wedge into interproximal surfaces, and stimulate to the extent of inhibiting the ciliated epithelium which lines the mucous membrane. In passing, I must confess that while I have felt that normal interproximal spaces must clear themselves of food debris, I did not know exactly how they should do it until I read this paper. The mere back and forth flow of saliva, which never occurs in the young, could not account for the keeping clean of the spaces as we find them in the young healthy mouth. The action of the specialized epithelium does it.

The author has observed in the cell what all of us have observed in the individual, *i.e.* that there are certain inherent peculiarities which are not yet fully accounted for. An irritation that will make a most profound impression on the mucous membrane of one person will not affect another at all. We have noted that our orthodontia band or a crown band which touches the gum produces in one case a marked inflammation, while in another it may be driven up even as far as the periodontal membrane without marked irritation. The author has found the case to be the same with the cells in the interproximal space.

When I heard the title of the paper, I thought it had something to do with the effect of mechanical irritation and abrasion on the hard tissues of the mouth, of which I have some knowledge from experiments and clinical observations. The author, however, says that finely powdered pumice seems to have a specially destructive effect on the ciliated epithelial cells. From microscopic observations of cuttlefish-bone powder I found that the corners of this powder are much sharper than pumice, and the mechanical abrasions would seem to bear out this fact. Has the author observed the effect of powdered cuttlefish on the ciliated cells? This is of great importance, because pumice and cuttlefish are largely used in prophylaxis and often in tooth-pastes and powders. Are precipitated chalk, charcoal, and magnesium oxid destructive to the cells? If the

sharp corners are the destructive agent in pumice, the same must be true of other insoluble sharp-cornered substances. If these powders must be used they should be thoroughly washed out of the mouth, because they not only cause the destruction of the cells as set forth by the author, but they also act as a point about which calcic deposits begin to settle. It has been observed in West Africa that the natives who regularly clean their teeth with sand on a pulpy piece of wood have little caries but much pyorrhea.

The author deals another blow to hydrogen dioxid. Now, it cannot even be recommended for cleansing a dirty mouth, because it may destroy the cells of the mucous membrane. This drug has lost caste in the past few years. We are certainly arriving at a more rational treatment of cellular tissues. At one time we thought we could cure by medication; today medicines which destroy bacteria are known to destroy tissue, and hence to hinder nature's methods of bringing about a cure. Potassium permanganate belongs to the same class of destructive agents and is of doubtful value. Potassium chlorate still holds its place.

What of the soaps? According to my own observation, they are in almost the same class as the H_2O_2 and the potassium permanganate. A mouth habitually treated with soap has a peculiar, whitish, glistening appearance. There seems to be a lack of full tone. The author says that soaps have a rather selective action on bacteria, that is, they will destroy bacteria cells more readily than tissue cells. The same claim was made by Dr. Jenkins for a soap preparation, but he did not say how he arrived at his conclusions, neither did he state that it also destroys the epithelial cells.

At this time, when so many agents are prescribed as a cure for pyorrhea, it is most desirable that we should have some definite knowledge of what effect each agent in a mouth prescription should have upon the mucous membrane. My own conviction is that we should not prescribe any drug or abrasives for general use, but only if there are special in-

dications for their use. If we do not know what action a given agent has upon the tissues we have little right to prescribe it. It is true, however, that almost all medication is empirical, which in a measure accounts for its waning influence in general practice.

Dr. LEUMAN M. WAUGH, Buffalo. The essayist, beginning in a logical way, informs us that the study of all vital phenomena should be based upon the cell, and that the activities of the cell are largely of a chemical nature, resulting in a modification of its morphology in a more or less marked degree. We are fully aware that the animal economy is but an exalted chemical equation, and that the condition of the body or of any of its parts is simply an expression of the sum total of the cells which compose it. Yet we cannot refrain here from reminding the essayist that the various structural and chemical features of the protoplasm of the cell are as yet but imperfectly understood, and it therefore follows that the cell cannot be an exact unit in the study of pathology; but that normal function and minute structure—in other words, physiology and histology—must form the basis upon which pathologic changes are reckoned. And the deeper one examines into this branch of science the deeper his parallel knowledge of the correlated subjects must be.

We agree that the influences which affect the vitality of cells may be most simply classed as stimulation and sedation, and that either of these may be exerted from without or within. Also that agents which ordinarily act within the physiologic range may, by excessive stimulation or sedation, overstep the physiologic maximum or minimum and cause disease. We are greatly surprised that simple foodstuffs, such as bread and meat, are capable of so readily producing irritation sufficient to result in abnormal function and degeneration of the mucous membrane. We were deeply interested to hear by what means these morbid changes were observed. In removing patches of tissue we feel that the irritation necessary may induce some subtle change.

We must most positively disagree with the essayist in reference to the sort of epithelium that is found covering the gingival border. He states that it is usually of the ciliated variety. The epithelium of all parts of the human mouth is of the stratified squamous type. In man, ciliated epithelium is always a modification of the columnar type, and from the microscopic examination of a large number of slides we must take emphatic exception to the views expressed by the essayist. The argument that physical agents such as fine pumice will result in the greater irritation because of the waving to and fro of the cilia must in consequence be an error. It may, however, be crowded beneath the free margin of the gum, and if not removed, produce irritation. The same will hold true of the chemical agents mentioned as having their irritating qualities increased by ciliary motion.

Following the practical teaching of the paper, and without entering into a separate consideration of the various chemical agents mentioned, we desire to make a plea for the most conservative use of so-called mouth-washes. We are strongly opposed to the position which unconsciously or otherwise, seems to be taken by many, viz, that our Creator in planning the human anatomy constructed tissue of imperfect quality, and that in order to maintain health it becomes necessary to constantly resort to the use of medicinal agents. We are of the opinion that much harm unknowingly results from the promiscuous use of antiseptic, germicidal, and strongly astringent mouth-washes. We should constantly bear in mind that the simpler solutions are much preferable to those having many ingredients of widely different properties. The component tissues of the oral cavity differ markedly in their characteristics. In the conservation of the hard structures the aim is to protect them against invasion by caries. This is a bacteriologic problem, and necessitates the use of antiseptics and germicides; these inhibit and destroy bacterial life. Bacteria are classed as vegetable cells. Is it not reasonable to presume that agents

capable of destroying vegetable cells, if too strong or employed too freely, would affect the growth of animal cells? The gum tissue will most commonly be treated with agents of entirely different nature and according to what the individual case demands. Those selected must not be injurious to the hard structures. Thus it will be seen that it is our duty to prescribe agents exactly suited for the needs of the individual case, and that much harm may result from advising preparations the true composition of which, even though the ingredients be published, are seldom suitable because of the wide range of their activity.

We regard this subject as one of vital importance, and one to which the profession is gradually awakening. It is the work to which the great Miller was about to devote his energies, and it is a channel in which the beneficent possibilities of dentistry are great. The inception of pyorrhea alveolaris is one of our gravest problems, and we believe that its ravages can be greatly reduced by increasing our knowledge in this direction. We are very glad that Dr. Cook is devoting his energy to this important phase of research.

Dr. R. H. HOFHEINZ, Rochester. There are a few practical applications of this subject of which I should like to speak. The essayist says that some tissue is capable of adapting itself to environmental conditions so as to gradually assume the appearance of normality. If we have any practical application of that theory we have it in the case of ill-fitting crowns. That question was talked about yesterday in a practical manner. Someone asked about the crowns that are poorly fitted and yet have lasted for years. There certainly must have been a pathological condition in these tissues, owing to the constant mechanical irritation, and yet if they have not always appeared normal, they have certainly acted normally, which for our case is practically as good.

The other point that I note is that certain tissues change from the normal to the abnormal functional activity by a slight change of the metabolism of the

part. I do not think that there is a tissue in the body which manifests that very fact more readily than the peridental membrane. In so many instances, where there is absolutely no other indication of disease, we find manifestations in the pericementum itself, and for that reason we are having there any quantity of troubles, which we frequently suppose to be local and which have their seat entirely in a systemic cause. Miller found in the most healthy mouths eleven species of bacteria, I believe. If these bacteria were allowed to individualize themselves, we would have to die of so many diseases that we could not live long enough to have them all.

I was very glad to hear the essayist speak a good word about potassium chlorate; it has been an old standby of mine. I remember very well, thirty years ago, Dr. Abbott recommending the use of potassium chlorate, an ounce to a pint of water, in almost every case of stomatitis, and in a great many cases of incipient pyorrhea. In one case of mercurialism, in syphilis, I found no remedy more efficacious than the use of potassium chlorid in the mouth.

I think one of the most discomfoting discoveries that has been made by the essayist is the effect of pumice upon the interdental spaces and upon the teeth themselves. He said that one-half hour after using a stream of water, a portion of that pumice still remains. If that is so, let us assume that we spend three minutes upon each tooth in cleansing it according to our present prophylactic methods. It would take two minutes to remove the entire amount of pumice with a stream of water, but as ordinarily we do not use a stream of water for this purpose in the mouth, but usually rinse it, it would probably take from four to five minutes—I should assume that that would be about the relative difference between the actual stream of water and the ordinary rinsing of the mouth, and it would thus require from four to five minutes to remove all of this pumice. It seems to me that this statement, together with the number of experiments made by Miller previous to his

death and unfortunately not finished, should cause some of us enthusiastic prophylactists to halt. We must wait for the final decision on this action of pumice on the tissues. I should like to say a good word here of Dr. Jenkins' tooth-paste, known as Kolynos. I have used the paste in a great many patients, and it seems to me that I have seen positive results, particularly in mouths where there was incipient pyorrhea. I have instructed the patients to use Kolynos by taking a bit of the paste upon the finger and working it gradually into the pyorrhea pocket before retiring and after cleansing their teeth in the morning, and unless I am decidedly mistaken, I have noticed some decided benefit from the use of that mouth-paste.

The very important point which Dr. Cook made at the end of the paper, namely, that many of the agents which clean teeth so wonderfully have begun to show their deleterious effects upon the teeth in a mechanical and then in a chemical way, is simply the same old question of the law of compensation, which shows itself in science in the same way as in daily life. It shows itself macroscopically and microscopically, but it takes scientific men like Dr. Cook to present it in such a clear manner to the profession as he has done today.

Dr. F. W. PROSEUS, Rochester. I am unable to discuss the paper with any intelligence on account of not having previously read it, but the importance of this subject cannot be overestimated. The three phases of modern dentistry which are of vital benefit for the public, are orthodontia, or the prevention of irregularities; prophylaxis, or the prevention of decay and of oral pathological conditions, which can only be perfected by such studies and work as has been done by Dr. Miller, and is being done by Dr. Cook, Dr. Head, and a very few men in the profession, especially in America; then prosthetic dentistry, which concerns itself with the restoration of the teeth after they are nearly or entirely lost. These three represent the whole field of dentistry from the point of view which is important to the

intelligent public, and perhaps eventually to all mankind.

As to Dr. Waugh's statement that there are no ciliated epithelium cells at the gingival border of the gum, it would be well for Dr. Cook to explain this. If, however, the paper is read and digested when it appears in printed form, its full significance will be appreciated.

Dr. F. A. BALLACHEY, Buffalo. I am very glad indeed to have heard Dr. Cook's paper, and although I cannot discuss it from the scientific standpoint, I should like to speak of two points brought out which struck me as being the most applicable to my work, namely, the use of pumice in prophylactic measures, and the use of hydrogen dioxid as a mouth-wash. My patients frequently ask me what I think of this drug as a mouth-wash. I have never recommended it enthusiastically because I never liked it in my own mouth, but I did not know that it was considered deleterious to the gum tissue. I think we should warn our patients against its too general use.

As to the question of the pumice, we all know that at the present day we do not do as much masticating as we ought to do. I wish to ask Dr. Cook if it is not possible that this irritation produced by the granules of pumice is beneficial to the tissue of the mouth rather than deleterious? Is it not possible that these granules staying in the gum for that length of time may stimulate it to a more healthy condition?

Dr. M. F. FINLEY, Washington, D. C. I very much appreciate Dr. Cook's paper, but I should like to say one thing in regard to the application of pumice in prophylactic work. It seems to me that the record of the mouths treated in that way would in a sense disprove some of Dr. Cook's claims, in that these mouths continue to be in a very fair condition following the very strenuous use of the pumice. Many cases here alluded to have been exhibited at clinics and privately, and would most certainly substantiate the value of the frictional effect of pumice.

Dr. W. G. EBERSOLE, Cleveland, Ohio. I thoroughly appreciate the work which

Dr. Cook is doing, for it means so much to those interested in prophylaxis. Personally I have been using hydrogen dioxid as a sort of scavenger, but from this day on I shall not use it, because I believe that Dr. Cook has gone into this investigative work more thoroughly than anyone else, and that we can rely upon what he has given us. I have also used pumice, but I am not prepared to say that I am ready to discard its use.

Dr. COOK (closing the discussion). So many points have been brought out in the discussion that it would take the rest of the afternoon to answer them as I would like to. Dr. Webster raised some very interesting questions in which we are all interested. Dr. Waugh called my attention to the epithelial structure, which I think is an important point. I used the word ciliated epithelium more in order to illustrate what I meant by the collecting in the opening of the mucous glands. I had prepared two or three slides that I expected to bring with me and show on the screen. Of course it is not a ciliated epithelium structure as we understand it, but there is a waving movement of these cells that give off mucus, which might be described as a tendency to the ciliated. In other words, the mouth of the mucous cell is held together, and as it opens and closes by the action of the mucus which flows out from the opening, there is a kind of suction backward after the mucus flows out.

One of the surprising things about pumice is that it has apparently an anxiety to get down into the cell, and to carry with it some bacteria. I have removed the tissue just as quickly as possible, and by a solution in Myers' method of staining we were able to determine the difference between the cells in which we had this irritant and those which had not been in contact with them. These were of course of a variable quantity. Some seem to think that we are trying to give a black eye to prophylaxis. When you read the paper you will see that I said that the present prophylactic treatment gives the tissues a greater resistance to bacterial action than any other treatment that I have observed. At the same

time we are liable, unless we take proper care in the use of many of these agents, to set up the very difficulty that we desire so much to prevent.

In regard to the point brought out by Dr. Hofheinz in reference to the Jenkins preparation, I wish to say that the formula we have from Dr. Jenkins is practically the same formula as Miller gave more than twenty years ago. I wish to say that the action of a preparation should be perfectly neutral, *i.e.* that it should consist of alcohol in combination with some other agent. Unless the alcohol solution is neutralized by some other agent it will have a very detrimental effect upon the mucous cells, because it has a tendency to dry the tissue, to temporarily diminish the flow of mucus, and to interrupt the essential physiological function of the mucous cells, which is to secrete or excrete mucus.

I am more and more inclined to believe that if by honest mechanical means we simply remove the deposits, and wash the tissues with a normal salt solution, we obtain the best results that we can expect at the present time. Agents that will act on bacteria are more detrimental to the normal tissue.

Dr. M. F. FINLEY, Washington, spoke to the societies with regard to the suit of Dr. W. H. Taggart against Dr. Boynton of Washington, over the cast inlay process, and asked the support of the members in defending this suit against Dr. Boynton.

The meeting then adjourned until Saturday afternoon.

SATURDAY—Afternoon Session.

The meeting was called to order Saturday afternoon at 2 o'clock, by Dr. White.

Dr. Göble presented resolutions with regard to the disposition of the Evans Fund in Philadelphia.

The next order of business was a lecture by Mr. Horace Fletcher, New York, and Venice, Italy, on "The Importance of Dentistry in Preventive Hygiene."

[This paper was printed in full at page

187 of the February issue of the *Cosmos*.]

Discussion.

Dr. C. R. WITHERSPOON, Rochester. I have looked forward with a great deal of pleasure to hearing Mr. Fletcher speak. We are all indebted to him for the work he has done and will do in regard to the question of nutritional problems. The question of saving money alone is one that must appeal to most of us, and it is very valuable for us to know that a man can nourish himself on one-third of the amount of food that has previously been considered necessary for him. There are a number of questions in regard to this matter that I should like to ask Mr. Fletcher, but as they are rather of a theoretical nature they had possibly best not be introduced into this discussion.

Let me ask, however, whether the improvement in the condition of the people under this system is in the essayist's judgment due primarily to the extensive amount of chewing, or to the limitation of the amount of food as the result of that chewing, or whether it is due to both. I should like to ask also in regard to the experiments of Professor Chittenden on the Yale athletes, in which he showed that they lived and got along better with one-third of the food ordinarily used, whether these men used the Fletcher system of chewing. In other words, whether the results were obtained with extensive mastication, or without it.

Mr. CHARLES H. WARD, Rochester. I am neither a dentist nor a medical man, and so I must discuss the paper from my own standpoint, and possibly as well from the standpoint of the ignoramus. But we who believe in the effect of environment cannot help noticing that Mr. Fletcher, who has cut meat out of his dietary, lives in Venice when at home. In cutting out meat, I believe he was anticipated by another Venetian of the name of Shylock.

That the mouth is the most important part of the alimentary canal is indicated by nature in the structure of animals. For the same reason the sensory organs surround the mouth, and the brain is

located in the head. The brain of some of the lower orders is merely a series of ganglia surrounding the mouth, and with few exceptions the so-called lower animals will eat nothing by which they are harmed. I never heard of an animal that would eat Limburger cheese, for instance. If we consider that the food is analyzed by smell, and re-analyzed by the tongue, the mouth refusing to retain the morsel not acceptable to smell and taste, the great surprise to me is that Mr. Fletcher has been able to follow his own method. Mr. Fletcher is a traveler, and a person does not have to go far from the beaten lines of travel to get into regions where, if he applies that theory of taste before swallowing and of the rejection of everything that does not taste well, he will have to carry his rations with him. In a civilized country this is inconvenient, but when the traveler comes into foreign countries, outside the beaten paths of travel, where men live on foods quite different from our own, it would require years of education of the taste before he could assimilate with any joy the food that is prepared for him.

Possibly Fletcherism really began before Mr. Fletcher commenced to promulgate his theories. The only men whose opinions on wine, on alcoholic liquors, or on the grades of tea are of any value, are men who practice precisely the method that we have just listened to—the slow careful tasting of it. On the other hand, the tippler imbibes so rapidly that there is no time for tasting, and therefore he does not know when to stop.

I feel that the revolution in dietetics is going to be a practical movement as surely as I believe that there is to be a revolution in dietetics.

Many years ago Dr. Beaumont, an American army surgeon, brought out his little book, "Physiology and Experiment," filled with facts ascertained by experiment. These facts have been quoted in all of the works on dietetics from that time on. For the first time in the history of the race it had been rendered possible, owing to the fact that a gun in exploding had ripped a hole in

St. Martin's side and stomach, for an experimenter to open a little door in the human stomach and put in a piece of meat or other edible, on a long string, time its retention, then remove it, and so by repeated trials ascertain the exact time required for the digestion of various foods. Every one of these periods of digestion registered by Beaumont represented the digestion of a man who took no pleasure in it, as he had neither eaten nor tasted the food. He did not even know in some cases that the experiment was going on, and in at least one experiment the man was purposely made intoxicated, and did not know that there was anything in his stomach. One of the statements made by Beaumont in regard to these experiments which always bothered me in my limited studies of this subject is that it made no practical difference whether the food was previously masticated very thoroughly, or whether the morsel, a piece of meat or vegetable, was introduced into the stomach in one solid chunk. Possibly in St. Martin's disinterested condition this may have been true.

The small margin between every man and the grocer's bill, by virtue of the struggle for existence, is such that if a man shows us how to reduce that bill one-half or one-third he has done more for the human race than the man who invents a new religion. With the average man the necessities of life come so closely to his income that the money needed for culture, for travel, for everything aside from the necessities, is naturally circumscribed. Take the poor man who is spending all that he earns on mere living. If we can teach him that with twenty-five or thirty cents he can keep a small family amply provisioned for one day, we have made an advance of inestimable importance in the evolution of the race.

Dr. WILLIAMS. As one engaged in the study of digestion I take great interest in Mr. Fletcher's work, and am more or less familiar with it. The one point that has impressed me is that we do not take sufficient time in that important part of digestion, the chewing of our food. That is to say, the food remains in the

stomach from three to seven hours; in the small intestine three hours, and in the large intestine upwards of eighteen hours. For the prehension of food, for placing the food in the mouth and masticating it, we are accustomed to taking much less time than we should, as everyone knows. That is the suggestive point to me, and I have often wondered if nature did not intend us to take more time for that part of the digestion.

Dr. GOLER. Mr. Fletcher, in referring to his grandchild, said that Sir Michael Foster remarked that if the child were born at all, and were not a monstrosity, the physiologies would have to be re-written. I should like to know what particular rules the mother of the child carried out previously to the birth of the child. I think that is one of the points we should all like to know.

Dr. G. W. COOK, Chicago. I do not know why I should be called upon, as my special study has been bacteria, and if Mr. Fletcher is going to change the physiologies of the country I do not see any reason for my studying bacteria any further. There have been several points brought out, however, that interested me very much. One was with regard to that waltzing process going on in the stomach during the digestive process. If my information is correct, the bacteria interfere with the digestion in the oral cavity, and are transferred with the food material from the mouth into the digestive tract. It is the bacteria that disturb certain of the digestive functions, because of their action on the foodstuff. In other words, they extract the nutritive substances out of the foodstuff during the process of digestion and are active as fermentive and putrefactive germs. Even the lowest form of life, the amoeba, will in a drop of water quickly move toward the substance that it likes or uses as food material. That amoeba is a unicellular organism, apparently with no mouth or nerve filaments or anything that pertains to what we consider the higher form of physiological function, and yet it evidently has the power to select the food that will act as nutritive substance in the cell.

It has been a great pleasure to me to meet Mr. Fletcher, and to hear his opinion on this question. From the standpoint of cell physiology, however, I am not ready to accept all that has been said today.

Dr. L. S. GOBLE, Rochester. The first word that Mr. Fletcher said on this subject was altruistic, and it is from that standpoint that I wish to speak. We all can see the psychological effects that he speaks of. I had a very clear illustration of this a few days ago, when reading about some experiments upon a dog; when food was placed in the animal's stomach without any of the psychological conditions, without the dog knowing it, the food which the dog did not like produced no stimulation of the glands at all. This made very clear to me an incident that occurred some years ago. One of my schoolmates had a large abscess which was opened, and after a few days he was entirely unable to take any food at all. He became so weak that the doctors said he would die in a few hours, because he could not retain anything in his stomach. He was asked several times if there was anything he wished to eat, and he said cheese, each time. The doctors said that a mouthful of cheese would kill him in a few minutes. Finally, when he became so weak that he was hopeless, they gave him some cheese; he began to nibble on it, and improved immediately. Inside of a week he was carried home to recuperate. He told me this experience himself, and said that he could think of nothing that he wanted but cheese. This incident clearly shows the psychological influence that Mr. Fletcher speaks of. When we get what we really crave, all the secretions of the stomach are immediately excited and produce the effect of quieting the stomach instead of agitating it.

I know people who have practiced Fletcherism ever since it was propounded, and who are intensely ill with indigestion; hardly anything is acceptable to their stomachs because their mental attitude is such that when the stomach is trying to digest the food, worry, fear, and anxiety are dominating their mentality. How can we have digestion under such

conditions? It is utterly impossible. Such persons are continually poisoning themselves by their own mental attitude. On the other hand, I have known people to go along in the happy-go-lucky way, swallowing their food without any attention to the chewing, and never have any trouble at all. This is no argument against the system; it simply means that we should go along in the natural way, and I think in years to come the psychological influence that goes with this idea of Fletcherism will be the dominant factor in every household at every meal that is taken. I have read much on this subject in a book published by Mr. Fletcher, entitled "Happiness as Found in Forethought Minus Fearthought." In that very interesting book he brings out the subject very beautifully in many different ways, and shows how, while we must nourish the body properly, all the chewing in the world is of no avail unless the mind be in the right frame.

In talking this summer at the seashore with some friends, this subject came up. One gentleman said that he knew a man who had a set of false teeth that did not fit him, and he had to go to a sanitarium on account of terrible stomach trouble. He became so ill that the teeth were taken out of his mouth; immediately he grew better, and in the course of a few months he was entirely well. Then he had another set of teeth made, and had not used them more than three or four weeks when the same trouble began again. He came to the conclusion that the fault lay in the teeth, and he threw them aside and has been getting along all right without any teeth, and is in perfect health. Now, the question is, whether the chewing of the food or the thought back of it was the more important. It is better to go to the table happy than with all the systems of diet that can be prescribed; it is better to eat with a cheerful heart than with a good set of teeth.

Mr. FLETCHER (closing the discussion). I should like to at once correct a false impression of this method. The discussion only goes to show how difficult it is to make ourselves understood

with regard to so simple a thing as this. You will all agree with me that today I have five or six times specified that Fletcherism does not mean merely chewing, but that it means the sufficient treatment of food before it is swallowed, in order that it may assist the digestion afterward. Did I not say that the whole process consists of the mental and the dental? Did I not also say that even though we may learn to chew properly, if we do not think properly in connection with it, all is lost? So when you come to think of Fletcherism, it is not merely the "chew-chew game," as it has been called, but it is the chewing of what it best liked by nature so that she can do what is best for you.

A MEMBER. Do you believe in conversation at mealtime?

Mr. FLETCHER. I believe that there is no objection to conversation if you converse in a manner that assists digestion. If you converse in a manner prejudicial to digestion, it is all wrong. If you are talking and thinking pleasantly, talk all you like, it will help, but if the conversation is disagreeable or scrappy, it will do harm. In this connection I should like to read to you Professor Chittenden's idea of the importance of the dental equipment, and also of the importance of a cheerful mentality in connection with it: "With the mind in a state of pleasurable anticipation, with freedom from care and worry, which are so liable to act as deterrents to free secretion, and with the food in a form which appeals to the eye as well as to the olfactories, its thorough mastication calls forth and prolongs vigorous salivary secretion, with which the food becomes intimately intermingled. Salivary digestion is thus at once incited, and the starch very quickly commences to undergo the characteristic change into soluble products. As mouthful follows mouthful, deglutition alternates with mastication, and the mixture passes into the stomach, where salivary digestion can continue for a limited time only, until the secretion of the gastric juice eventually establishes a distinct acid reaction, when salivary digestion ceases through destruction of the

starch-converting enzyme. Need we comment, in view of the natural brevity of this process, upon the desirability for purely physiological reasons of prolonging within reasonable limits the interval of time the food and saliva are commingled in the mouth cavity?"

Let me also say, as in the case of Luigi Conaro, if you prescribe the amount required by one man, he necessarily gives more time to the limited quantity than he does when bolting his food hastily.

In regard to the question of eating while traveling, asked by Mr. Ward, I have to say that I spent fifteen months in the tropics, and made no provision for food whatever; I ate whatever I could eat, and I never found a supply of food anywhere from which I could not obtain something palatable with this method of eating, and I suffered no inconvenience during those fifteen months. Imagine, besides the immense amount of responsibility, which might be looked upon as trying, during that time, the coming in contact with different conditions and the varying climates; and yet wherever I have used that natural precaution, nature's food filter, I have not suffered from inconvenience or discomfort.

In regard to the grandchild that I spoke of, I would say that four or five years previously to the birth of the child the mother was sustaining herself on one-third of the amount of proteid deemed necessary. Moreover, while the child was developing, at one time she partook of some fruit that was infected, which produced gastric ulcer, and within less than six weeks from the time of delivery she went for nineteen days without any food at all, in order to allow the gastric ulcer to heal up. It is well known that in cases of ulcers of that kind, complete abstinence from food is the best method of allowing the stomach to recuperate. The child was born, however, and was a normal child.

Dr. SAGER. I should like to ask what two publications would give the best instructions to the beginner?

Mr. FLETCHER. "The A B Z of Our Own Nutrition," and "The New Glutton or Epicure."

A MEMBER. I should like to ask how to teach a child to masticate food properly?

Mr. FLETCHER. The first thing to do in giving instructions is not to teach anything wrong. Ninth-tenths of the children, especially in their infancy, are taught that they must not leave anything on their plate, and also that they must eat when mamma eats whether they are hungry or not. If the child is watched and guarded against misinformation, he will begin to pick out for himself what is the right thing to eat. The great affliction that we suffer from in this age is the plethora of food by which we are surrounded, and the continuous suggestion to eat, even to the point of gluttony. That, in connection with what I call aggressive hospitality—*i.e.* hosts wanting to stuff us to see the effect of the food—is the condition by which we are surrounded all the time, and this misconception forced on the minds of the children is generally detrimental to them.

A MEMBER. I should like to ask whether it is best for a person who is leading an active life and follows this system to take up his activities immediately after eating; or is it best to remain quiet for a time after eating?

Mr. FLETCHER. I usually take up my activities immediately after my meal. It does not make any difference how active you are, as long as you are active constructively.

In closing, I wish to thank you very heartily for your kind attention.

There being no other business before the societies, the meeting adjourned until the next annual meeting.

PENNSYLVANIA STATE DENTAL SOCIETY.

Fortieth Annual Meeting.

(Continued from page 243.)

THE CLINICS.

Dr. E. P. CARTY, Scranton. "Internal and External Anatomy of the Face, Showing Original Carvings."

Dr. D. GENESE, Baltimore, Md. "Coloring Silicate and Oxid Cements by Using Phospho-Aluminate of Zinc."

Dr. C. G. HUGHES, Punxsutawney. "Gold Inlays as Abutments for Small Bridges."

This is a unique and simple method of bridging-in a tooth that has been lost, there being two soldered-back crowns on each side. The connections are made by cutting inlay retentions in the Richmond crown and casting the inlays and backing for Steele facings or pin teeth in a solid piece. The facings are made removable, also the inlays used as bridge connections, using diatoric teeth or crowns, removable, and showing no gold in the mouth in connection with the work.

Dr. G. S. SCHLEGEL, Reading. "Porcelain Crown with Cast Base."

This clinic showed an esthetic restoration of bicuspid and molars. The technique consisted of grinding roots one and one-half millimeters below the gum line on the buccal side and one millimeter on the palatal or lingual side. Enlarge the root-canals for iridio-platinum pins, of a gage to suit the case. Cut the pins flush with the surface of the roots, and countersink the openings of the root-canals one and one-half millimeters with inlay burs. Grind a detachable porcelain crown suitable for the case to approximately fit the root. Press wax on

the end of the crown and against the root. Note where the openings are located. Heat the pins slightly and with pliers anchor to place. Press the pins, wax, and tooth on to the root. Trim off all excess of wax, put in the sprue wire, and treat the case like an inlay, casting directly into the porcelain.

Care must be taken not to check the porcelain. If the operator desires, he can remove the porcelain crown before casting, thereby casting the base only. The crown is then cemented to the base.

It is the opinion of the clinician that such a crown properly adjusted will not split the roots, nor will the root decay at the junction of the root and base, and if broken it can be easily repaired by replacing the broken crown with another of the same mold. A record should be kept of the molds and the kinds of teeth used in such cases.

Dr. CHRISTIE D. JOANNIDES, Paris, France. (I.) A New Artificial Crown and Cap with Interchangeable Porcelain Face. (II.) Non-Removable Bridges.

I.

The requisites of an artificial crown being to protect the root from decay and restore the appearance and function of the natural crown, several forms of crowns for this purpose have been devised, but there are still many disadvantages to be ascribed to the various methods of making the same.

It is obvious how wrong the common way is of using caps which, being thick at their contour, cannot be accurately adapted to the circumference of the root,

some space always being left here and there around the neck, in consequence of which the cement with which the caps are filled produces irritation of the gums. By being dissolved this cement causes many diseases, to be spoken of later. On the other hand, on account of the caps not being accurately adapted to the root, the function of the latter is impaired, the thick caps, being but an extraneous substance in the organism, do not fill the physiological and anatomical position of the crown in the mouth. Furthermore, long caps, as usually made, by being adapted deeply to the root produce solution of continuity. On account of all this, the irritation thus caused produces inflammation of the gums and contiguous parts, especially in persons who are thus predisposed; hypertrophy, absorption of the gums, and even chronic pyorrhea may result, attended with greater or smaller disturbance of the alveolar process and the adjacent tissues, all of this being the result of the decomposition of food which is retained around the abnormally fitting artificial crown.

Two points in the actual way of preparing crowns are essential for avoiding such untoward effects. It is preferable, when preparing the root, to avoid cutting it with hard instruments; instead a well-centered carborundum stone should be used, continuously supplied with antiseptic water by a disk-moistener in order to take away the molecules left by grinding, also to avert the heat produced, and consequently, the irritability. Crowns must have a very thin contour at their edges, so that by being accurately adapted to the root they preserve the same from irritation of any kind, and all subsequent diseases.

Having studied these subjects for many years, I have devised a new system which I take the liberty of presenting to you. I shall try to show how by this system the disadvantages of all others are overcome, while it is very easily applied.

The cap which I have devised is made of soft platinum of one piece instead of two parts; the softness of the metal allows you to obtain a perfect im-

print of the margin of the root. This margin is needed to adapt the artificial crown to its anatomically correct position. The method of operation is as follows: After treating the root to which the crown is to be fitted, cut a little at its neck by means of the carborundum stone, and expose it by pressing down the gum all around with gutta-percha. On the second day, cut the edges of the root, from which the gums have been forced away, so as to render them smooth and parallel. An accurate adaptation of the cap is thus obtained, and any projection of it around the neck of the root is avoided.

Next open in the center of the root a small cavity, prepare a ring of its size, and after having soldered it on a piece of platinum plate of No. 35 gage, insert a dowel, which is fastened on the plate, the ring thus permitting an accurate adaptation of the cap to the root; then fix the cap upon the root by pressing it with some amadou and the burnisher until a perfect imprint of the neck of the root is obtained. Take the cap out of the root, solder the pivot with gold from the inside, and fill the cap in order to strengthen it, leaving anteriorly a margin of metal of about $\frac{1}{2}$ mm., while posteriorly a larger margin of $1\frac{1}{2}$ mm. should be allowed. The cap is annealed, and a second adaptation of it to the root gives to it the exact form of the root. When the proper form is obtained, finally strengthen the cap by soldering, this being done at the posterior part with a second piece of gold or platinum plate, it being known that the pressure of the jaws is always directed from the posterior toward the anterior. The backing of the interchangeable porcelain facing is easily made by a special instrument of my own device.

The advantages of this method are as follows:

(1) A new crown and cap is obtained with interchangeable porcelain facing, being firmly fixed on the root in such a manner as to perfectly preserve the root from decay and also withstand the pressure exerted upon it.

(2) The porcelain facing will not be

broken or be exposed to the action of the fire, which may spoil its color.

(3) Artificial teeth in case of need can be given the exact color of the natural ones by having a cement, colored for the purpose specified, reflected through the transparent porcelain facing.

(4) On account of the perfect adaptation of such caps to the root, due to the thinness of the cap, an invisible union between the crown and the root is effected.

(5) All diseases and discomfort to the patient as produced by the other systems are avoided.

II.

There is an interesting point in crowns prepared for bridge work which requires the dentist's particular attention. I therefore thought it desirable to point out the observations I have made on that subject, and to give some suggestions as to how to correct the deficiency in such crowns.

Crowns intended for bridge work, after having passed through the various preparations needed for the mechanical part of the work, are often subjected to a slight alteration in their form, being somewhat loose, in consequence of which a visible deviation in their adaptation is produced, which may end in inflammation of the gums. This, either being the result of the action of the flame or of some defect in the manipulation, is obviously a deficiency that must be avoided on account of the alterations to which the cement is exposed, as has been explained in my former communication.

I have successfully tried the double crown. My idea is to first cover the root with a very thin crown which not being connected with the bridge allows a more easy manipulation all around the tooth, while the thinness of the metal produces a perfectly smooth adaptation to the neck of the root, which cannot be obtained by the usual method. In that way, the second crown need not be extended so deeply to the root, but may stand a little higher, while the deviation usually observed on crowns is fully avoided. In order to

avoid any space being left between the two crowns, fill the outside crown with wax, which on being pressed against the inside crown, will show where that space is located.

It may also be advisable in bridge work to use in some cases intermediate porcelain molars, of small size, in order to avoid the excessive pressure exerted by the large molars on the teeth supporting the bridge. By doing so, the mastication will be somewhat impaired, but we undoubtedly should try to avoid the certain loss of the natural teeth. I should also point out that in bridge work we should prefer a straight set of the intermediate teeth, as any curve would produce unequal pressure and consequently sooner or later cause a deviation of the bridge.

Dr. T. C. TRIGGER, St. Thomas, Ontario, Canada. "The Preparation of Cavities for Gold Inlays, and the Methods Used for Retention."

The preparation of cavities for gold inlays, and the methods used for retention differ so materially from other forms of fillings, that special consideration is given to the technique of their formation.

It will be impossible to describe in this clinic in detail all the forms of cavities that are met with in practice; I shall therefore limit my remarks to some cavities in the anterior and posterior teeth, illustrating the principle of cavity preparation for gold inlays.

Cavities prepared for the reception of gold inlays are almost the reverse of those used for cohesive foil fillings, inasmuch as no angles are permitted and undercuts are entirely avoided. The principles of cavity preparation which I shall describe are adaptable to the matrix method or to the casting process of constructing inlays, both of which methods I have used for a number of years with gratifying results. I obtained a report of a paper on this subject read by Dr. F. T. Van Woert, Brooklyn, before the Central Dental Association of Northern New Jersey, in which the same principles are set forth as I advocate in the preparation of cavities for gold inlays.

Gold inlays have been greatly used in molars and bicuspid, although they can be used successfully in almost any cavity. As the methods of preparation of cavities in bicuspid and molars are very similar I shall briefly describe them together.

Cavities in which a considerable loss of approximal and occluding surfaces has occurred, and where the decay extends to a considerable depth without involving the pulp-chamber, are the most common form of cavities which we have to deal with in inlay work. Fig. 1 shows this form of cavity; the support of the inlay depends upon the side wall of the cavity.

After the cavity has been prepared in the usual manner by cutting away all frail walls of enamel and cleansing the cavity of all decay, the next operation is the preparation of the marginal edges. The marginal edges of the cavity are cut as nearly perpendicular as possible, slightly diverging toward the occluding surface; the occluding surface should be cut in a crescent form running toward the central fossa into the healthy tissue; the surface cut in this manner will give considerable lateral support to the inlay. At the junction of the buccal and lingual walls with the gingival surface it should be cut in a rounded form for mechanical reasons, for, if definite angles are used, the matrix would be more difficult to force and to burnish to such acute angles, and, if an impression of the cavity is taken in wax, this portion may possibly fall short in accuracy. The wax being a resisting material cannot be forced into all parts with acute angles.

Cavities formed in this manner make it easier to insert the matrix; the restoration of the cavity in wax and the removal of the wax is rendered easier, and finally the insertion of the inlay is accomplished without any difficulty, as the corresponding surface on the inlay allows an easy passage of the inlay into the cavity. All the marginal surfaces are composed of straight lines and planes, and no definite angles are used. The marginal edges of the cavity should be made perfectly straight and beveling should be avoided. Beveling the mar-

ginal edges will only complicate the cavity preparation, and at the same time increase the labor of finishing the filling, without giving better results. In cavities of Fig. 1 class where the depth will allow a "core" of cement to be inserted in the base of the cavity and built up according to its shape, the cement will prevent the unnecessary extension of the matrix to the base of the cavity, or of the wax used in taking an impression of the cavity. The use of this intervening substance will allow a chance for the insertion of pins, posts, or loops which may be attached to the inlay, and may extend into the cavity according to the amount of intervening substance. This core is finally removed, and forms a receptacle for the final attachments of the inlay. The cement used for the core is mixed to a stiff mass, inserted across the whole floor of the cavity, and built up so as to form a ledge for the inlay; this is accomplished by using carving instruments with which any desired form may be obtained. Fig. 1 shows the position of the core.

In cavities where less anchorage can be secured in the cavity, and in vital teeth where the decay is of limited extent, a dovetail extension can be made in the occluding surface which will produce an interlocking effect on the inlay when seated, and thus prevent any approximal dislodgment. The side walls will prevent the inlay from being dislodged laterally. Fig. 2 illustrates this form of cavity preparation.

The dovetail extension is made in the direction of the central fossa, involving all the defective tissue, and giving sufficient retention to that part of the inlay. Usually only one extension is required, since more than one will only complicate the preparation of the cavity. In cutting this step great care should be taken, since the dentinal cap which forms a roof as it were to the pulp is the most sensitive portion to be dealt with in preparing the cavity; the operator should cut this extension with fine cutting burs in order to cause the least pain to the patient. In large compound cavities involving a large approximal surface the same prin-

ciple of cavity preparation should be carried out. In these cavities, where considerable contour restoration is required, the security will depend on the cavity

from the buccal and lingual extremities in the occluding surface. By cutting the cavity in this way lateral support is secured for the inlay. Fig. 3 adequately

FIG. 1.

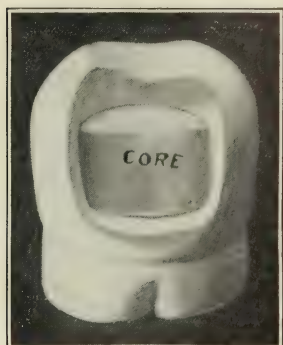
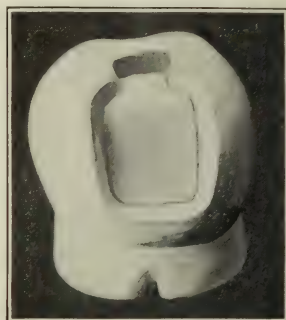


FIG. 2.



walls as well as on the retention within the cavity. The buccal and lingual surfaces in molars to be thus prepared should be freely cut away, and made as near perpendicular as possible; the ap-

illustrates this form of preparation. A dovetail extension is made into the central fossa as previously described.

Such a preparation of the occluding surface gives a double retention by lock-

FIG. 3.

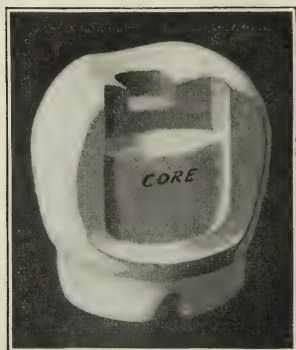
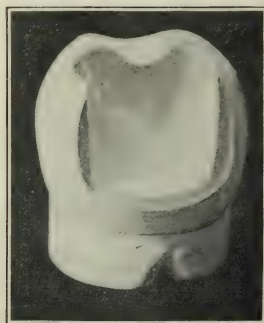


FIG. 4.

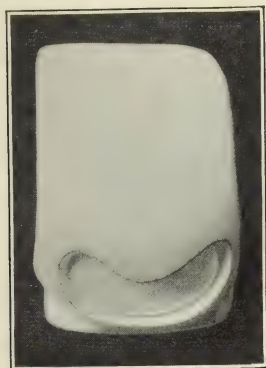


proximal surfaces of the margins of the cavity should be cut flat. At the union of the buccal and lingual surfaces with the gingival surface the angle should be cut in a round form with suitable stones and burs. If the tissue of the occluding surface is extensively involved, and the side walls possess considerable strength, the occluding surface of the enamel should be cut a short distance distally

ing the inlay in place, and a core of cement may be inserted at the base of the cavity, thus allowing ample space between the inlay and the base of the cavity for the attachment of pins, posts, or loops, which may be used to suit the conditions, affording another means of retention of the inlay. Thus it will be observed that in proportion to the extent of decay, the retention of the inlay

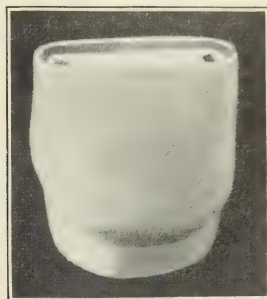
will be increased. The core of cement is removed before the final setting of the inlay, to give way to the extensions made on the inlay and to the cement which seals the inlay to place.

FIG. 5.



faces. The inlay is inserted directly into place from the occlusal surface, and can only be withdrawn in the same way. Fillings inserted in this way can only be dislodged by adhesive material, such as taffy

FIG. 6.



In approximal cavities in molars where the occlusal surface terminates in a strong wall of enamel toward the central fossa, without any imperfections of enamel, an anchorage can be secured by

candy. The whole distal surface of the cavity can be made flat, thus securing an easy surface for the removal of the matrix or the wax model. The principles of cavity preparation, as outlined in the fore-

FIG. 7.

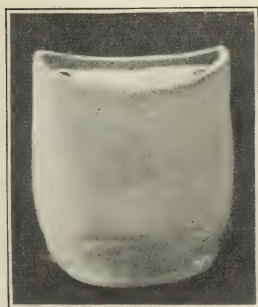


FIG. 8.



cutting grooves along the buccal and lingual walls, making the cavity wider at the occlusal than at the gingival part. Fig. 4 clearly shows the shape of the grooves described, which can be cut by means of a suitable fissure bur. Before the inlay is finally set, undercuts can be made into the buccal and lingual sur-

going, are applicable to cavities in anterior teeth. Such cavities of a large area can be successfully filled by the inlay process, since they admit of easy insertion, and no such complicated attachments are necessary as when cohesive gold is used for filling. In this situation cavities are usually found to partly

extend below the gum line and toward the approximal surface. In saucer-shaped cavities abrupt walls are made. In commencing the preparation of the cavity a round bur may be used to remove the decalcified tissue, then a fissure bur can be applied to cut the walls of the cavity as perpendicular as possible, avoiding, of course, a beveling of the edges. The gingival walls of the cavity should present a larger arc of a circle than the corresponding opposite surface. By cutting the latter surface in this way a

tion is needed, an extension can be made on the lingual surface.

In approximal cavities of incisors involving the incisal edge and terminating in a strong wall of enamel, the labial surface should be cut perpendicularly to the axial line. The juncture of this wall with the gingival wall should be made rounded to secure a firm seat for the inlay, as is clearly shown in Fig. 8. In this situation the gingival wall at the labial side should be cut with a shallower curve, as the tooth is naturally thinner.

FIG. 9.

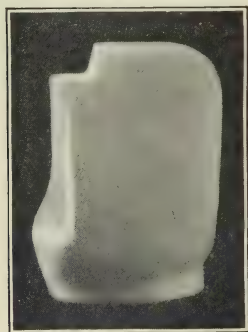
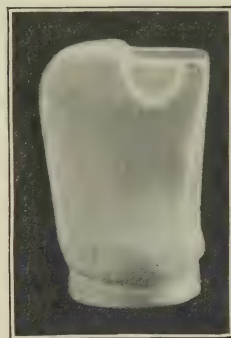


FIG. 10.



saddle-form retention for the inlay will be secured. The approximal surfaces should be cut in a rounded form. This form of cavity preparation is shown in Fig. 5.

In the restoration of the incisal edge, whose loss is usually caused by abrasion, two forms of preparing the surface may be used; one is to cut the enamel perfectly straight as in Fig. 6, and the other is to cut it in a crescent shape, Fig. 7, to give some lateral support to the inlay. A cavity surface is obtained in the enamel to form a deeper seat for the inlay, extending as far toward the outer surface as the strength of the enamel walls will allow.

To form a retention for the inlay, holes are drilled toward the approximal surfaces, according to the size and depth of the retention required.

This principle may be carried out in the restoration of broken angles of incisors; in some cases where special reten-

Fig. 8 shows the outline of such a cavity. The lingual surface of the cavity should be cut in a curved form; this will allow enough space for the passage of the inlay, if the approximal space is limited.

If two approximal cavities are formed at the same time, the larger one should be inserted first, in order to allow the insertion of the other.

In this form of cavity the retention depends on the depth of the cavity. In devitalized teeth the retention can be secured in some cases by a staple inserted into the root-canal, or if the cavity is not very deep, a hollow space can be made in the inlay, and the retention then depends upon the binding effect of the cement. In frail incisal edges, which should be protected, a step is cut horizontally to the axial line, a short distance toward the central line, terminating in a marginal wall slanting toward the incisal edge, as is shown in Fig. 9. The rest of the cavity is prepared in the same way

as the foregoing. In fillings where much retention is required to prevent the inlay from being dislodged, an extension can be made into the lingual surface, as shown in Fig. 10. The ridge of enamel between the cavity proper and the extension into the lingual surface prevents the inlay from being dislodged laterally. A groove is cut in the base of this extension to prevent the inlay from moving labially or lingually.

By a proper cavity preparation, together with attachments made in the inlay and the use of an intervening adhesive substance, such as cement, the inlay receives a stronger retention than any other filling at our command.

For a number of years I have so successfully used the matrix method that I do not consider it wise to entirely abandon it. This method will continue to play a part in the construction of gold inlays wherever it is properly indicated. The casting process has, however, broadened the field in this class of operations.

Dr. H. E. KELSEY, Baltimore, Md.
 "A Useful Modification of the Anchorage Used in Expanding the Dental Arch."

The object of this anchorage is to provide for the expansion of the entire arch, roots and crowns, as well as the alveolus in which they are implanted, and possibly for a widening of the nasal passage

by stimulating further development of the adjacent bones of the face. The marked changes in the facial expression which can be accomplished would seem to indicate that such a further development does take place. The construction is simple. Fit strong bands upon one or several molar teeth and upon the canine. To these bands a connecting wire is soldered which curves upward between the gum and cheek to a point at or above the middle of the root like an inverted U, with the ends attached to the bands. To the summit of these strong rigid connecting arches the tubes are attached for the ends of the expansion arch, which by a bayonet-bend downward on each side may be made to pass around the arch low enough to permit ligaturing of the anterior teeth, and avoid irritating the frenum labium. With this device the ends of the roots may be expanded even more than the crowns, if it is desired, by carrying the loop and attached tube a little above the middle of the root, which can usually be done without irritation to the buccal tissues, as in the extremely contracted arches which demand this form of expansion the lips and cheeks are loose and flabby, with plenty of room for appliances. The square-tube and square-end expansion arch may be used in conjunction with this form of anchorage, if desired.

MARYLAND STATE DENTAL ASSOCIATION AND THE DISTRICT OF COLUMBIA DENTAL SOCIETY.

Thirteenth Annual Union Meeting, Baltimore, Md., June 4-6, 1908.

(Continued from page 254.)

FRIDAY—Afternoon Session.

THE meeting was called to order by Dr. Hardy, president of the Maryland Dental Association, at 4 o'clock.

The afternoon meeting was devoted to reports of clinics.

Evening Session.

The meeting was called to order by Dr. Taylor, president of the District of Columbia Dental Society, at 8 o'clock P.M.

The first order of business was the discussion of Dr. Harris's report as chair-

man of the Committee on Dental Education.

[This report was printed in full at page 243 of the February issue of the *Cosmos*.]

Discussion.

Dr. W. A. MILLS, Baltimore. Dr. Harris's paper is an opportune one, and should be read and studied by every member of the dental profession. When thoroughly perused, his views upon the many subjects mentioned under the title of "Dental Education" will prove like a "Daniel come to judgment." "Be polished gentlemen," he says. "Observe the golden rule. Uphold the dignity of your calling by setting a refined moral standard for yourselves, thus throwing a halo of glory around all with whom you come in contact," etc. If this is not preaching the gospel, what is it? Oh that the commercial woods were full of it! Heaven hasten the day!

The dental education of the student after he receives his degree must be continued by his individual effort. He should attend all dental meetings as far as possible, always make it a point to find time to read and study such dental, medical, and other books as will better prepare him to practice his profession and to keep in line with the advance column. As regards the education of the general public, this can be done by instruction given at the chair and by publishing from time to time in the daily press such articles as the state association may see fit to print.

Exception is taken to one clause in this admirable essay. Where Dr. Harris says, "It is a waste of time and energy for our associations to discuss dental education as routine work," believing that "the subject can safely be left for the schools to solve," etc. While it is admitted that most of the dental schools are conscientiously trying to do their duty as regards the attainment of higher standards set for the admission to their class of students who are well capacitated for receiving instructions and fully able to realize the requirements and the great

responsibilities of becoming ethical professional gentlemen, it is believed that were it not for the barriers thrown around them by dental laws and dental examining boards, there are still sufficient unprofessional colleges left to taint the body professional. The latter class of colleges are like some individuals; they are always on the alert, caring little for professional ethics or high standards, being ever eager to capture the almighty dollar. The time has not yet arrived when the matter of dental education can be left altogether with the dental colleges or even the medical schools.

Dr. A. B. CRANE, Washington. I did not hear the paper, but there is one point in the subject of dental education that has been impressed upon me very forcibly since I graduated from college, and that is the lack in all dental curricula, as far as I know, of a course in physical diagnosis, especially with relation to the disease conditions of the heart. The dental student is given a course in anesthesia, and is told that in valvular lesion and in certain other conditions of the heart an anesthetic should not be given, and that in certain mild diseases of the heart-muscles and almost all functional diseases of the heart, anesthetics, such as gas, may be administered. The student goes out to practice, and a patient comes into his office and says, "Doctor, I do not know about my heart. I do not know whether I can take gas or not." It must be said to the shame of dental education that the average young dentist does not know any more about the heart than the patients themselves, and it impresses itself upon me that this is one subject that should be included in the dental curriculum, if we are going to send men out into the world to give anesthetics.

The next order of business was a paper by Dr. C. N. JOHNSON, Chicago, Ill., on "A Consideration of Some of the Present Tendencies in Dental Practice."

[This paper was printed in full in the September issue of the *Cosmos*, vol. 1, p. 934.]

Discussion.

Dr. E. C. KIRK, Philadelphia. I do not know that I should say anything at all about the paper, except to do what has already been done by my predecessors, and that is to express my great gratification at the point of view which the essayist has taken. I do not know of anything more necessary to be done in the work of our profession than from time to time to call a halt and take a look around and see where we really are. I have watched with a great deal of concern these tendencies on the part of my professional brethren to run off too enthusiastically with new ideas that are brought out from time to time, and I have waited patiently for the underlying element of common sense in the profession to get the control, and swing the pendulum back again to the conservative line. It is that idea which after all is the essence of the theme which Dr. Johnson has put before you this evening, and I applaud that phase of the paper.

I want to say a word about the old "new departure," the plastic departure. I am fortunately, or unfortunately, old enough to have been able to take an intelligent interest in that state of affairs when the fight was pretty hot. I got mixed up in it myself to a small extent, and one of the hardest combats of a professional sort that I ever had was with one of the doughtiest champions of the new departure—than whom a dearer, sweeter soul never breathed God's atmosphere—and I speak of him reverently because I met him as an enemy and we parted as very close friends. I think he was misunderstood. He brought a message to the dental profession; he said things to the dental profession that the dental profession did not understand. And from the interpretation that the essayist put upon the old "new departure," I gather the impression that possibly he was one of the number who did not quite absorb the meaning of some of the things that Dr. Flagg said about his new departure. Now, one article in his creed, the creed of the new departurists, which seemed to excite the most comment was

that article which said that "In proportion as a tooth needs saving, gold is the worst material with which to do it." And I fell out with Dr. Flagg on that ground. I said that is not true, for I always was and still am in agreement with the principle set forth by the essayist that where a tooth can be saved with gold at all there is no material known to dentistry that will do it as well or as thoroughly as gold under the conditions specified by the essayist, but that was not what Dr. Flagg meant. Very few men who discussed this question with him, that antagonized him in debate, knew that he was an expert manipulator of gold. He was a gold operator, and his operations were good operations, but he had found, as all of us have found and do know, that gold would not save all teeth. Now, what did Dr. Flagg mean when he said that in proportion as a tooth needs saving, gold is the worst material to do it with? With that eccentricity that was a peculiarity of his, he dressed his thought in a statement that was capable of double interpretation. His point of view was that the more a tooth is decayed, the more it is damaged by caries, just to that extent it needs saving the most; the more it is damaged the more it needs salvation. There is rather good ethical ground for such a point of view, and so Dr. Flagg said in effect what I think we now all believe, that there is a point in the destruction of teeth by caries where gold is not the best means for saving them. That I think is the meaning of Dr. Flagg's statement. Then something else must come in as a saver of these remnants of teeth—it may be plastics, and it may be inlays.

I remember one occasion where a young man in one of the classes of the institution with which I am connected made a great reputation for himself as a manipulator of gold foil. I never saw an undergraduate who did better gold work. He became an enthusiast, a specialist in gold filling. He was one of those individuals who possessed high manipulative skill and he produced results. Well on toward the close of the final year, I went one day to the chair where

he was operating, and as usual he was surrounded by a number of young men who were taking instruction from him, and I said, "What are you doing?" He said, "The same old thing, a contour gold filling." I said, "Have you ever done any amalgam work?" He said, "No, I have not." "Well," I said, "almost anyone if he sticks to it can learn to do what you are doing, but I think it takes a man of greater manipulative skill—and this may be heresy, but if it is make the most of it—to save a badly decayed tooth with plastics than to save a moderately decayed tooth with a good gold filling."

Now, I think we have no difference, the essayist and myself, with reference to the importance of high manipulative skill; of course we must have that, and I agree with him when he says that this tendency to utilize as a short cut to the best results the means offered by plastics in the past, and being offered by inlays today, is demoralizing to our highest ideals, and so I would say, harking back to the apostolic reference of our eloquent brother who opened the discussion, there is another apostolic incident that I would like to refer to at this point. Let us erect three tabernacles, one for gold, one for plastics, one for inlays in their proper place, but let them all be dedicated to the salvation of the human teeth.

I think that the essayist has given us a paper which to me is one of those papers that lifts us up to a mount of dental transfiguration where we can take a broader view of our position and see just what we are doing, call a halt, and be careful that we do not lose sight of our ideal. And I would suggest that the ideal we need for guidance, is not the ideal alone of manipulative skill, but as Dr. Flagg would say if he were here to-night, the ideal of the salvation of human teeth.

Dr. B. HOLLY SMITH, Baltimore. I really do not find much to differ with in this most interesting paper. Dr. Johnson for years has been an inspiration to me, and for years I have regarded him as the man who had the right to speak for his section.

In the first place, his paper is most

timely, as assaults are being made from every quarter on the use of gold as a filling material. I thoroughly believe that students should be taught and trained in the manipulation of gold, but I would say to the essayist that it has been many years since I have had the effrontery to put a contour gold filling in the incisal region. I was trained to do it as a student, and had the privilege not long ago of having a lady bring to me and deposit in my hand an incisal filling, almost a crown, that I put in at the infirmary of the Baltimore College of Dental Surgery in 1881. I think this filling required about fifteen sheets of gold; the whole palatal surface was built up with that material. But that is a memory, and it will never happen again in my practice. I made that filling as a student, and such a failure would probably not happen to Dr. Johnson. We all know that there has been an evolution in the practice of dentistry. When the Crawcours brought amalgam to New York they were despised and ousted, but they brought a principle and taught us something which has been beneficial. Now that porcelain has come to take the place of gold, you may despise it, but it is absolutely as certain to become an approved practice as a little rivulet on the side of the mountain is sure to grow into a large stream. You know for a certainty that there will come a time when gold as a filling material for the incisal region will be abandoned.

As to the training of the student, I am satisfied that Dr. Johnson is right. He has been one of the best operators in the West, and such technique as he demands should always be a part of the training of a well-equipped dentist.

My final objection to large cohesive gold operations is the strain on the patient's nerves for such an extended period of time as is required for a successful accomplishment of the work. Time is something, and every time you keep a delicate woman in your chair under stress you lessen her vital power, and perhaps shorten her days.

Dr. H. C. THOMPSON, Washington. As I understood the paper, and I have

tried to follow it very closely, Dr. Johnson has in no way denounced the new departure, but on the contrary he has rather lauded it. With him we must recognize that this new departure, unlike the old one, has come to stay, and it is demanded and required that it be practiced. At the same time the essayist is warning, especially the young men, against taking short cuts. If, for instance, Dr. Smith had not learned to make those enormous gold operations, would he have been the operator that we know him to be today? When we look back on men like Donaldson, Winder, and others, who were skilled soft-gold operators, can we compare the fillings made by short cuts today with their operations as far as durability is concerned? When the student is taught to operate on a tooth, he takes a mental photograph of the cavity which he is preparing, and when he puts in the filling, he unconsciously makes a mental picture of the tooth to be restored. This restoration is only perfect if he makes a perfect picture, and unless he has the manipulative ability his operation will be a failure. Short cuts are likely to induce indifference in detail. We must remember that our modern progress is due to the high technical skill which we have attained in the past, and if we forget any of the steps in the ladder by which we rise, we may have to go back and put new steps in. The average young man, for instance, if in preparing a cavity for a filling he is suddenly forced into the new departure, will forget one of the fundamental principles in operating; that is, he will prepare the cavity for the material rather than select the material best adapted for the cavity. In other words, he will not consider the properties of materials for special cases, but will make any case meet his special material. He becomes mechanical rather than scientific.

Dr. A. C. BREWER, Baltimore. I would not add anything to the paper, but to emphasize the laws of manipulative skill. Men must not confine themselves to one method for everything, but exercise good judgment in selecting a mate-

rial in accordance with the location and conditions.

Many times cases come under my observation where inlays have been inserted by men who could have made beautiful fillings, and where amalgam was indicated; the inlays had proved utter failures, not because they were inlays, but because the conditions were such that it was impossible to do with inlays what could have been done with amalgam.

In regard to the silicate cements that are being used so much today, it seems to me that the profession should be warned against them, especially the younger men, who take the superiority of these cements for granted simply because the manufacturers say that they are a permanent preparation. I have tried them under all conditions, with the greatest care and with all kinds of instruments. While some of these cement fillings are satisfactory, a large percentage of them leak and turn dark, and sometimes the whole filling discolors, beginning from the bottom. A material with which we cannot be sure of definite results, or of results that compare with those of porcelain, gold, or amalgam, should not be used or advocated by us. I am not judging from my own experience, but have seen the same results from the hands of operators who are enthusiastic; in many cases the work looks very well, but other cases are failures. Let us be careful and conservative about discarding old methods that we know to be good, even though they require longer time and harder work.

Dr. W. A. CAPON, Philadelphia, Pa. Most of you heard my paper this morning, and I think you will agree with me that this paper and mine almost dovetail. I only regret that I was not able to couch my ideas in the eloquent language of Dr. Johnson; otherwise I think the two papers are very much along the same line.

With regard to gold operations, I am very thankful that I did learn at one time how to insert large gold fillings, because it has made me appreciate the efforts that I have been making in my special line of work to a very great extent.

I am sure that if Dr. Smith could have seen the records of large contour porcelain operations that I presented this morning, he would have been very much pleased.

Dr. T. S. WATERS, Baltimore. I have no criticism to offer and I can only commend the paper. Our views coincide perfectly.

There is one thing I would like to say, however. Dr. Smith speaks of the great stress which is imposed upon our patients by inserting large contour fillings. Common sense and good judgment should govern us in all our operations. When we meet patients of very nervous temperament, it is our duty to do for them the very best thing we can possibly do for their comfort and the salvation of their teeth. I find in my experience, however—and I have done a great deal of contour work—that large compound contour work depends upon the confidence with which we have inspired our patients. I have a patient who was in my hands about a month ago, a woman of very nervous temperament, and I thought I would shield her from a large contour operation, and decided to put in an inlay. I prepared the cavity and took the impression to make the cast inlay. After I got through preparing the cavity and taking the impression, the patient said to me: "I wish you had put in the old-fashioned gold filling for me. I shall have to come back and have the inlay set, and the strain of waiting is too great on my nervous system. If you had put in a filling as you used to do, I could have gone home happy and been through with all the trouble." The highest skill is requisite, it matters not in what sort of operations. The cast inlay requires just as much skill in preparing the cavities and almost as much time in casting and finishing, as the old-fashioned contour filling. If we manipulate our gold rapidly and accurately we need not keep the patient such an exceedingly long time, but in preparing a large cavity for a cast inlay it is necessary that the walls of that cavity be thoroughly polished if the cast inlay is to be a success. If not enough time is spent the impression will

not be perfect, and when the inlay is cast it will not go to its seat perfectly. But if time is taken to polish a cavity perfectly before the impression is made, the cast inlay will go to place and be perfect.

Another point I wish to make, and one which I intended making in discussing Dr. Hinman's paper last evening, is that greater care is required in the preparation of a cavity for the cast inlay than for that of a matrix inlay. You do not have to prepare the cavity so thoroughly for the matrix inlay as for the cast inlay. The walls of the cavity do not have to be so carefully polished. I wish to thank Dr. Johnson for his very admirable paper.

Dr. C. C. HARRIS, Baltimore. The discussion seems to tend rather to extremes, not in regard to the average work which we have to do every day, but in reference to large gold operations in the anterior teeth. The average operation is not a large one, and it is not one that is necessarily conspicuous. It certainly seems to me as if in the course of porcelain or gold inlay work the cavities are made doubly the size which is really necessary for a painstaking manipulator of Abbey's non-cohesive gold. I firmly believe—if you will pardon me for being so personal—that I can save the six anterior teeth with Abbey's non-cohesive gold better than any man on earth can with porcelain inlays or the newer cements. I do not mean to say that I would be successful in every case, but my average along that line of work is better than that of the inlay worker. And what is more, these fillings are not necessarily conspicuous. If the teeth are prepared in such a way that the light will reflect from behind they will look just as clean, just as inoffensive, as they would with an average porcelain inlay.

Dr. C. E. ABBOTT, Franklin, Mass. In the presence of these deans of the profession who have just spoken, my words must needs be humble. I wish to express to Dr. Johnson my great regard for him, for his works, and what he stands for.

Two thoughts occur to me: First, I cannot see why a method that is not

needed in practice should be kept in the college curriculum for dental education. I refer particularly to that miserable anachronism of the soldered brass plate required in the senior year of the college course, which kept me from learning many things of importance which I have had to struggle to learn later. Secondly, gentlemen, I am not a lazy man. I have gone to my office many times at five or six o'clock in the morning, and worked to master things that had to be mastered. I despise the lazy man who will slop cement into every cavity and will not do good work, and yet I make my little plea for the patient. I think we should stand for thoroughness in work, yet patients have many teeth not attended to because of their dread of us. By our very thoroughness we can drive patients from all thorough men, and it seems to me advisable if possible to seek some means by which we can give them the proper service and spare them the pain of roughness. At the same time I do not wish to be considered a careless or indifferent man, but we should remember when we do work for our patients that they trust us and we should fully do our duty toward them. The average dentist does not care much for what he does, as long as he makes it easy for the patient, but if we do not consider the patient's feeling sometimes, it may jeopardize his interests in the salvation of his teeth.

Dr. N. A. STANLEY, New Bedford, Mass. The thought that Dr. Johnson emphasizes is that thoroughness in the training of the young man must not be lost sight of. If a man becomes the head of a large business house or corporation, a cotton mill, for instance, he starts at the bottom and learns every step of the work from beginning to end and thereby becomes familiar with that invaluable groundwork that serves him in his future career, and without which he could never be the successful head of a great business. It is just the same in the professions; a man must have the groundwork and acquire a thorough training, or else he cannot take up or maintain a commanding position. We must go step by step before we reach this position. There is

no top; each step enlarges the horizon. The technical skill and training that I received twenty-odd years ago in the dental school and offices was the groundwork and the foundation of my future work. I have not listened to the extremist; he is a dangerous man for the young operator to follow. If anything, I prefer to err on the side of conservatism. I have used inlays and I try all the new things that come to hand, but I also use discrimination. Good judgment is the first requirement that every dentist must possess, judgment that tells him the best way of using the marvelous skill of the hands; without this guide he cannot perform lasting operations.

Dr. JOHNSON (closing the discussion). Dr. Smith and I agree absolutely, although he tried to make it appear that we do not. If I led you to infer that I am in the habit of inserting large contour fillings in incisors, or in any tooth in patients who cannot well tolerate a long operation, I made a wrong impression. I believe as sincerely as Dr. Smith that we should study the nervous system of our patients, and if I have done one good thing in the practice of dentistry it has been to dispel among my patients the dread of dental operations. I have done more good in my own private practice by very carefully studying the temperaments of my patients than I have ever done in the profession generally. When Dr. Smith said that few men have that wondrous influence over their patients by which they can control them and have them come to their offices and sit in the chair with confidence and comfort for any kind of operation, I could not help feeling that the chief office of the dentist is to so prepare his patients that they can come with such confidence and without any dread. This brings me to one point that I always stress before young men, namely, the necessity of studying temperaments in the practice of dentistry. I have made the assertion that no professional man has the opportunity of so thoroughly understanding human nature as has the dentist, because he comes into closer or at least more frequent contact with people than men of

any other profession. It is beautiful to have boys and girls come to your office and make a rush to see which one will get into the chair first, and if we can control our patients to that extent and bring them to our offices with that feeling, the patient will submit to any operation necessary, without nervous tension. If you can control your patient, you can do the best work for that patient, whether it is hard for you or not. We have no right to consider ourselves when the ultimate good of the patient is at stake. While I have made the assertion that there is no need today for extensive gold foil operations, I have in the past stood at the chair and have inserted large contour gold fillings in the lower third molars with the disto-buccal cusp gone entirely, and with such deep cavities that the gum would cover more than one-half of the finished filling; yet I do not regret the time and the work that was required for such fillings, and I never overtaxed the nervous system of the patient. But times have changed, and I would not practice that today. I should put in a gold inlay under such conditions. Nevertheless, in inserting an inlay in such teeth I should not have such sublime faith in the phosphate cements that I should depend upon them for holding the inlay in place. In other words, I should try to apply the technique of the operation in such a way that the preparation of the cavity would mechanically anchor the inlay in position. The danger that comes from the adhesive properties of phosphates is that men become careless in their technique, and invite failures. If we would do work with good results we must pay attention to the closest details, and must anchor these inlays mechanically in just the same way as we do gold fillings.

I wish to refer to one thought that Dr. Kirk brought out. I think Dr. Flagg was misunderstood, but let me say that the significant thing in all these crusades, in all these new ideas, is not the point of view of two or three men who may understand them correctly, but it is the point of view that the profession gains; and the profession received a wrong im-

pression about the virtue of the plastics, which did infinite harm. I revere the pioneers, but I am thinking all the time of the young men. It is the point of view which they get that counts, and we can therefore never hold up too high ideals to the young men. There have been men in the profession who stood for the highest and best, and we can reverently point back to some of the pioneers of Maryland—Hayden and Harris. I am glad to be in the city that gave birth to dental education, and has been so closely identified with it throughout its existence.

I have seen a gold filling which was inserted in the mesial surface of an upper lateral incisor and gave excellent service for sixty-two years, and which was still doing good service. Let me ask you, Has dentistry been developed by the free use of plastics or by gold foil to its highest efficiency for saving teeth? I simply wish to call your attention to this question, and ask you to think about it. Don't let us lose our high ideals.

In conclusion, I wish to express my gratefulness to the members of the two societies for all their courtesies shown me since I have been with you. I have been received with open arms, and I thank you very heartily for your kind reception.

The meeting then adjourned until Saturday morning at 10 o'clock.

SATURDAY—*Morning Session.*

The meeting was called to order Saturday morning, June 6th, at 10 o'clock, by Dr. Hardy, president of the Maryland Dental Association.

The first item on the program was a paper by Dr. EDWARD C. KIRK, Philadelphia, on "The Constitutional Element in Certain Dental Disorders."

[This paper was printed in full in the August 1908 issue of the COSMOS, vol. 1, p. 804.]

Discussion.

Dr. C. N. JOHNSON, Chicago, Ill. This is a subject to which the profession gen-

erally has not given the attention that it deserves. I feel grateful to Dr. Kirk for coming here and giving us a paper which is most suggestive and treats of a subject that we need at this time. We have not studied carefully enough the manifestations of immunity and susceptibility connected with dental disorders. We have looked somewhat into the clinical aspects of the particular immunity and susceptibility connected with dental caries, but those other disorders, diseases of the pericemental membrane and the surrounding tissues, the diseases which cause a wasting away of the natural support of the teeth, we have not sufficiently understood. As I interpret Dr. Kirk's paper, he laid in his argument special emphasis on faulty nutrition and imperfect elimination. There are many men in the profession who treat diseases locally without paying any attention whatever to any possible systemic relationship. This is one limitation of the practice of dentistry, that we look too narrowly at things. The whole environment of our lives leads us to look too narrowly at things—we are always studying the details. In many instances we look only at the cavity in the tooth and plug it, instead of studying the conditions surrounding the teeth. It is important in those instances which Dr. Kirk mentioned, to study the conditions and trace the disease back to the ultimate cause. I cannot go into a technical discussion of faulty metabolism, faulty nutrition, and faulty elimination. This is a paper which requires a good deal of study, and I shall await the appearance of the paper with much interest. I believe the essayist has given us the keynote to the study of these things, and he has placed the matter more clearly before us than it has ever been done before. I do not believe that we know anything definite of these phenomena, of the possible relation of the systemic disorders to the local manifestations that we meet in our offices, and I thank Dr. Kirk again for coming here and giving us such a valuable paper.

Dr. B. HOLLY SMITH, Baltimore. I never felt as proud in my life as I feel

at this moment. I feel that this is the culmination of a great meeting, at which our guests have given us papers which may almost be called epoch-making. I believe that the message which Dr. Kirk has brought us is the most important that has been delivered in ten years. While we have been filling teeth, the medical profession has been looking to us for some suggestion of light as to the ravages of such diseases as erosion and pyorrhea, and they have been astounded at our inaction along these lines.

I do not believe that we were ever intended to live in houses. These monumental buildings that surround us are good enough to pack our belongings into, but I do not believe that it was ever intended that we should live in them. We should live out of doors, where the hemoglobin of the blood is manufactured. The whole subject of the paper is so fruitful of thought, and I am so poor in the comprehension of it, that I do not wish to delay the hour of adjournment, but would say with Dr. Johnson that I shall look forward to the publication of that paper and read it sacredly as I have read my Bible. It is very gratifying to me that Dr. Kirk has delivered this important message before our union meeting, and I am particularly grateful because it gives us some hope for the solution of the problem. The filling of teeth is merely a part of our day's work; erosions and pyorrhea destroy more teeth than does caries.

Dr. C. J. GRIEVES, Baltimore. I wish to thank Dr. Kirk heartily for the paper. It seems almost a sacrilege now to ask a question in the discussion of a paper which marks an epoch in the study of two of our most important dental diseases, but we have had some discussion here about the washing out of cement from the joints around inlaid fillings in certain mouths, and I would ask Dr. Kirk to say a word as to this in closing. It seems to me that I have noted a greater solution around inlays in mouths presenting erosion, and I should like to ask if that is the explanation of the solution of oxyphosphates and the discoloration along that line. I think the societies should

extend an enthusiastic vote of thanks to Dr. Kirk.

Dr. W. A. MILLS, Baltimore. I have listened with more than ordinary interest to the reading of Dr. Kirk's paper, for the subjects of faulty metabolism and suboxidation of waste products of the human organism and their sequelæ have been accorded much study for some time, especially in their relation to dental disturbances, both local and reflex. I had expected to read a paper at this meeting bearing upon the essayist's subject, entitled "Acute Pericementitis, Caused by Rheumatoid Arthritis," but it was too late to have it appear on the program, and I hope to read it sometime in the future, giving full details. I wish to cite briefly the following case, one of several which have been successfully treated with systemic medication: The patient complained of throbbing pains in the lower left first molar, which seemed to be caused by acute pulpitis. All of the usual remedies were used locally, also a purge, but they all failed to give any but temporary relief. The patient said that gas was forming at the root of the tooth. Tests were made and the pulp was found to be living, but the pericementum seemed very much involved, responding to both heat and cold. The patient pleaded to have the tooth opened, but as no edema or swelling or ordinary signs appeared, I refused, and the patient was again treated locally and dismissed. She returned in a week's time, and insisted that the tooth be opened, or she would have it done by someone else. Then it was that I gave way, despite my better judgment, and bored into the tooth, only to find a living pulp. This was removed and the canals filled. Again the patient returned and said that the filling must be removed, as she was almost insane with pain. Again the tooth-canals were opened, but with no relief. She returned again and said that the tooth must be refilled, as "the saliva got into it and made it ache." This was done and the patient dismissed for further developments. She returned saying that the second bicuspid was giving her trouble. The same routine was

gone through as with the first molar, *i.e.* devitalizing the pulp, filling the canals, opening them again, and refilling them. This continued for weeks, the patient only getting temporary relief spasmodically. She again returned and said that the first bicuspid was aching worse than all the rest. As this particular tooth had had its pulp removed some nine years before and seemed to be in good condition, I began to examine very closely the soft tissues surrounding all of the affected teeth. I found no infiltration, but they were all acutely sensitive to touch, heat and cold, also to pressure from all directions. At this stage of the disturbance the patient was worn out from loss of rest and weary from intense pain, the condition having continued during a period of six months. I was at a loss what to do, for the constant demand on me for relief had begun to wear upon my nervous energy as well as on that of the patient. Discovering that the patient was then suffering from an acute attack of rheumatoid arthritis of the finger joints, with all the usual systemic disturbances that follow in its wake, I realized for the first time what an absurd treatment I had been giving her, having sacrificed two healthy pulps to my ignorance. The patient was immediately put upon treatment with colchi-sal globules and ammonol, the first to remove the cause, the second as an analgesic and sedative. The first globule given relieved the pain. After administering eighteen globules, six every hour for six hours, one every two hours for twelve hours, and one every four hours for twenty-four hours, all pain was relieved, and there was but slight tenderness of the tissues. In two weeks the patient was well. Now, three months since the treatment, the patient is in better general health than before.

As Dr. Johnson has just said, most dental practitioners seem to take the position that all dental lesions have their origin in a small cavity in a tooth. They absolutely fail to comprehend the fact that many abnormal conditions of the oral cavity have their beginning in the derangement of some function of the general system, and should be treated ac-

cordingly by the administration of such drugs systemically as the cause may indicate; otherwise they fail to do their duty to their patient.

Dr. KIRK (closing the discussion). Answering Dr. Grieves' question, I would say that undoubtedly the acid condition which is responsible for erosion of the enamel or hard structures of the teeth is also responsible for the solution of oxyphosphate cement. Oxyphosphate, by the way, and I don't think it is generally known, is soluble both in acids and alkalis and is only stable in a neutral solution. Acids combine with the zinc oxid and dissolve it readily, and alkalis combine with the phosphoric acid and disintegrate the cement in that way. The arthritic condition or the type which is represented by excessive use of carbohydrate foods—that is, the erosion type, a subdivision of arthritism that expresses itself among other ways in erosion of the teeth—will produce the acidity that will dissolve oxyphosphate cement.

The case which Dr. Mills describes is a typical one. It was just that class of cases that focused my attention on the relation of arthritism to diseases of the periodontal membrane. Now, we are taught, but unfortunately we forget what we are taught, that from an anatomical standpoint the union of the teeth with their sockets is a joint. The dento-alveolar articulation is really an articulation, because it has all the anatomical elements of an articulation. It is of the order gomphosis, and we speak of it as an immovable joint. It is only relatively so. We may move it within certain narrow limitations. We know from experience that rheumatoid arthritis is not true unequivocal gout. When we speak of gout we have in our mind the classic picture of a testy old Englishman with his foot swathed in bandages, losing his temper and hurling bootjacks at his valet as the result of his nervous irritability, and we are familiar with what takes place in the articulation of the great toe. We know the inflammatory condition under process of evolution is the tophus of the gouty disease. The pathology of it is simple enough. The articular tissues of the

great toe are subjected to a great amount of work, the whole body-weight is repeatedly thrown upon it in walking, and it is more subject to injury because of its exposed relationships. It is well recognized by physiological chemists that a tissue undergoing an unusual stress from overwork is subject to excessive oxidation. We know when we exercise ourselves unusually, how the next morning we are stiff, and this stiffening up is due to over-oxidation in the muscles and the inability of the vascular system of the muscle to relieve itself of the retained metabolic waste products; the reaction of the tissue to litmus paper is changed, that is, it is relatively less alkaline, and we have there what we may call an acid area or a relatively less alkaline area. The same thing occurs at times in the dento-alveolar articulation. When in eating we overwork our teeth or if in the denture one tooth is more prominent than others, or is a little out of alignment, so as frequently to have to bear the whole stress of occlusion, that one becomes the selective point for the beginning of an alveolar disease. That tooth has more work to do because the full force of the jaws is brought against it because of the malocclusion. Here again we have a lowered alkalinity, and when the blood current, loaded to saturation-point with the waste products of nitrogenous metabolism, flows into this area, they are deposited; for these waste products are held in solution at any given time by the alkalinity of the blood plasma, and as soon as it strikes this acid area, precipitation of them occurs. We have that same condition as was shown by Ebstein to lead to the deposition of uratic salts in the articular tissues of arthritics. A section of such a tissue under microscopic examination will show all the usual or normal cellular elements of the tissue, and in their midst a deposit of needle-like crystals representing waste nutritional products; and we also find the cells in that area around the crystalline deposit dying from mechanical or chemical irritation; that is to say, we have an area of necrobiosis. This being a point of diminished resistance becomes

infected, and suppurative inflammation sets in. That is what Dr. Mills had in the case he described; he had an abscess on a tooth with a living pulp; he had the beginning of an arthritic pyorrhea alveolaris. It is very mystifying when we have a thing of that sort, and because we never heard of such a thing we cannot understand it. The whole cause of the mystery is because of the discharge of pus on the outer surface of the gum, but supposing the pus works its way up the side of the root and discharges at the gum margin, then presto the whole thing is perfectly clear—it is pyorrhea. The whole difference is that in one instance the pus comes out through the gum and in the other it works its way up the side of the root to the gum margin. The so-called pericemental abscess is from the pathological standpoint a typical lesion of pyorrhea alveolaris of the arthritic type, a deep-seated pyorrhea, if you choose, which differs clinically from ordinary superficial pyorrhea, but not pathologically at all. Dr. Mills would have had no difficulty with his case if he had not been misled by the patient, and had simply applied the temperature test to the tooth to determine the question of the vitality of the pulp before he drilled into it. The temperature reaction is conclusive; in all arthritic cases the intoler-

ance of temperature is so marked that there is no difficulty in detecting a tooth affected in this way. As Dr. Jack has taught us, the range of temperature tolerance is less with teeth affected by pericementitis of the arthritic type or deep-seated pyorrhea than it is in normal teeth.

I wish to thank all present for the interest shown in the paper.

The next order of business was the reading of a paper, by Dr. MACTIER WARFIELD, Baltimore, Md., on "Ethyl Bromid as a General Anesthetic," which was discussed by Dr. W. A. Mills, Baltimore, Dr. F. Groshans, Baltimore, Dr. A. B. Crane, Washington, and Dr. B. Holly Smith, Baltimore.

Dr. B. HOLLY SMITH. I do not want this meeting to close without our sending some word of greeting to Dr. Frank Holland of Atlanta, Ga., who is at the present time languishing on a sick bed at Saranac Lake, New York. I move, therefore, Mr. President, that the secretary be instructed to send a telegram of cordial greeting to Dr. Holland.

The motion was carried.

There being no further business, the meeting adjourned until the next annual session.

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PHILADELPHIA, MARCH 1909.

EDITORIAL DEPARTMENT.

THE FIFTH INTERNATIONAL CONGRESS.

WE publish elsewhere in this issue an exhibit of the organization of the Fifth International Congress, to be held in Berlin, August 23-28 of this year, and we here direct the attention of our readers to this important meeting.

Beginning with the Paris congress in 1891, four international congresses of dentists have been held; the second at Chicago in 1893, the third at Paris in 1900 and the fourth at St. Louis in 1904.

At the close of the Third Congress, held in Paris in 1900, there was organized the International Dental Federation, the expression of an effort to give continuity to the subsequent international congresses, and through these great meetings to endeavor to bring about the harmonization of the world's dental interests. For the nine years that the Fédération Dentaire Internationale has been in existence it has held annual meetings and has faithfully carried on its work, often at great disadvantage and in the face of many difficulties and obstacles. Nevertheless the F. D. I.

has accomplished an immense amount of work and achieved results of the utmost importance. Besides giving its attention to the work of the congresses, of which it is to all intents and purposes the committee *ad interim*, it has taken up and discussed those fundamental questions of education and of legislation which are the bases of our professional fabric. In considering these questions the Federation has had to deal with a most complicated situation, differing radically from the same questions as related to local or state conditions. Being an international body and having no legislative powers its functions are necessarily advisory only, in which respect it may be fairly compared with the Hague International Peace Conference; and, as it was the object of that great body to ameliorate if not eliminate the horrors of international warfare, so it has been the purpose and function of the several conferences of the F. D. I. to eliminate from the dental legislative and educational systems of the several countries those elements which fail to achieve the greatest good or operate as obstacles to the most rapid professional advancement in dentistry in and among the various nations interested in the movement. The F. D. I. in its study of these basic questions was and is confronted with the heterogeneous character of the laws governing dental practice in the various countries, and with a similar confusion as to educational standards.

From year to year the fundamental problem of dental education has been considered in the light of existing conditions in each country, and gradually order is beginning to grow out of the chaos which characterized the earlier state of the question, so that at its last annual meeting it became possible for the F. D. I. to recommend a form of dental curriculum upon which the representatives of each nation could agree at least to the extent of offering it as a basis for harmonious action.

Work upon the subject of dental legislation had necessarily to be delayed until the educational problem had shaped itself into something approaching definite form and which projected legislative work could take as its natural point of departure. Much attention has, however, been given to the study of dental legislation, and the groundwork has been laid for an active consideration of the dental laws of the various countries with a view to ultimately bringing them into more harmonious relation.

Incidental to the work of these annual meetings of the F. D. I. there has been accomplished a result in the highest degree satisfactory, and that is the establishment of relations the most cordial and friendly among the delegates of all the nations represented. Mutual respect and a friendly tolerance of differences of opinion have been engendered by the social features of the meetings, and the spirit of good-fellowship that has always prevailed has done much to smooth out difficulties and clear the way toward an harmonious conclusion upon the important subjects under discussion. It will be the duty of the Berlin congress to act upon the reports which the F. D. I. will make with respect to the subjects that have been before it for consideration since the St. Louis congress, and the action taken thereon at Berlin cannot fail to be of far-reaching importance.

Since the congress of St. Louis the developments in dentistry have been numerous and important. The introduction of the cemented filling has attained such general popularity that the supremacy of the older methods of tooth-conservation and restoration is seriously threatened. These later innovations will dominate the thought of the section on operative dentistry, and opportunity will be given for a full consideration of the merits of the cemented filling in comparison with those of the older class of filling operations. Such a discussion as will be provided at the congress upon this important topic is highly desirable at the present time for the purpose of bringing out the experience of the world's best operators and determining to what extent the general dependence upon the cemented filling as a restorative procedure is justified.

Prophylaxis and its basis, oral bacterio-pathology, with the problems of susceptibility and immunity, have attracted widespread attention and study, more particularly since the St. Louis congress, and these questions also will receive due attention and expert presentation at the Berlin meeting.

While the work of organization and of preparation has been somewhat delayed, everything is now in satisfactory condition and the prospects are favorable for a large and highly important meeting. The National Committee for America is ready to give any information that may be needed respecting the congress. All dentists members of dental societies in the United States in good

standing, or non-members in ethical practice, are eligible for membership on indorsement by the National Committee for the United States.

Essays, clinics, and exhibits are solicited by the National Committee, through whom they should be sent.

Always heretofore the dental profession of the United States has been an important factor in the international congresses, and our representation at Berlin should be no exception unless it be exceptional in its completeness and character. Apart from the scientific and technical features of the congress, the meeting will afford opportunity for a delightful holiday and to enjoy the experience of German hospitality and *Gemüthlichkeit*—there is no other word for it—in their capital city.

Let our watchword, then, be "On to Berlin!"

THE N. D. A. PAMPHLET ON ORAL HYGIENE.

At the meeting of the National Dental Association held in Boston, July 28-31, 1908, the special Committee on Oral Hygiene, through its chairman, Dr. J. D. Patterson, presented its report and submitted the text of a proposed pamphlet to be issued under the auspices and by authority of the National Dental Association for the purpose of instructing the public upon certain elementary questions of oral and dental hygiene. The report of the committee was adopted, and the pamphlet—entitled "The Mouth and the Teeth"—has now been printed in quantities and is ready for distribution through dental societies and by individual practitioners. The pamphlets may be had in any quantity at a price of fifty cents per hundred, upon application to Dr. C. S. Butler, 267 Elmwood ave., Buffalo, N. Y.

The text of the pamphlet appears in full in the DENTAL COSMOS for December 1908, at page 1368.

Correction.—In the formula for "Iodo-glycerole (Talbot)" printed in Dr. Talbot's paper, at page 154 of the DENTAL COSMOS for February 1909, the proportions are correctly given in percentage amounts, but in order to make about two full ounces, as the text states, the amounts given should be taken in grams instead of grains, as stated incorrectly in the text.

REVIEW OF CURRENT DENTAL LITERATURE.

[*Journal of the American Medical Association*,
Chicago, December 19, 1908.]

ALVEOLITIS, OR SOME PATHOLOGIC CONDITIONS ARISING FROM INEFFICIENT CARE OF THE MOUTH. BY M. H. FLETCHER, D.D.S., M.D., M.S., CINCINNATI.

After a few introductory remarks on the importance of oral hygiene for the prevention of oral diseases, the author comments on the nomenclature, which lists the disease to be described as Riggs' disease or pyorrhea alveolaris, and explains his reasons for the selection of the term alveolitis, which enables him to distinguish the different stages of the disease as acute, chronic, suppurative, and necrotic, and may be modified as to definite pathologic characteristics by the adjectives "tuberculous," "syphilitic," "pyemic," etc.

Pathology. Alveolitis in its progress includes all the processes known to other surgical disease of bone, viz, acute, chronic, suppurative, and necrotic stages. In the author's opinion, the initial, exciting cause, in at least nine-tenths of the cases, is the formation of calcareous deposits about the necks of the teeth. The tartar being adherent, nature cannot remove it, and the inflammation becomes more extended and violent, resulting in raw tissue and open bloodvessels at the point of contact with the tartar; this naturally results in the formation of pus, in small quantities at first. The surrounding of a foreign body by pus or the floating of the foreign body in pus until the surface is reached and an opening made for its discharge, is a familiar process in the case of a thorn or splinter in the flesh.

Tartar against the gum margin is a foreign body and nature endeavors to dispose of it, just as she would in the case of a splinter. The tartar being fixed only continues the irritation, with pus as a continual result. The thin edges of the alveolar process, being continually attacked by pus or osteoblasts, soon begin to melt away, and the membranes

covering the bone and roots of the teeth disappear with it. As long as the irritation remains, this process continues, its rapidity varying in different individuals and environment. Thus it is seen that nature in this particular malady, if unassisted in her attack on her enemy—the calcareous deposits—destroys the tissues surrounding the teeth until the tooth with its attached tartar is extruded, thus finally accomplishing what she started to do.

The acute or incipient stage of alveolitis may continue for a lifetime with no appreciable inconvenience or pain to the patient, the progress often being so slow that there is nothing to reveal the presence of the disease aside from the receding of the tissue about the necks and roots of the teeth. But infection may take place about one or more teeth at any time, producing periostitis either inside or outside of the socket, proceeding from one stage to another, ending in necrosis of either limited or extended degree.

Etiology. Abundant evidence can be presented to maintain the position that without local irritation, destructive diseases of the soft and hard tissues about the teeth and alveolar process would be confined to those due to traumatism, thrombosis, nutritional changes, and bacterial stomatitis, with now and then an infection from circulation as in other tissues. But these affections would then be attributed to their special causes and treated accordingly.

The most frequent point of attack for alveolitis is in the septa between the teeth, where tartar is not disturbed by the lips, the tongue, food, or brush. But any place about the necks of the teeth where tartar is undisturbed is apt to be a point of attack.

The opportunity for the entrance of infection to the alveolar process is almost unlimited, for calcareous deposits about the necks of the teeth are found in every adult human mouth and in the mouths of most children.

The quantity of tartar and the irritability

of the soft tissues in its presence varies in different individuals, and with each individual according to his power at different times to resist disease after its onset. Auto-intoxication, or lack of resisting power, however caused, makes one more susceptible to other diseases as well as to this. But a low state of health could hardly be the sole cause of an infectious disease. The microbes of infection are ever present in great abundance, Miller having isolated more than one hundred different kinds of bacteria from the juices and deposits in the mouth. So when the gums and periosteal membrane are sore and bleeding from the impingement of tartar, bands, the wedging of food, or any other irritant, infection may readily start and the disease follow. Lesions of the gums about the teeth are so universal that the wonder is not that there are so many diseased mouths, but that there are not more.

A lesion of the gums because of the immediate proximity to the bone seems pre-eminently a suitable place for the beginning of any of the surgical infections of bone. The infections to be considered in alveolitis are those that produce osteomyelitis, caries, or tuberculosis of bone, gummata, or syphilitic lesions, and actinomycosis. The ultimate result in each one of these infections is dead bone.

Necrosis from lead, mercury, phosphorus, and all other chemical causes are not to be considered here, since their etiology is apparent. The diagnosis, then, in any single case lies between an infection by pus-producing germs such as accompany osteomyelitis, tuberculous germs which produce caries, syphilitic germs which produce gummata, and actinomycosis. The last named produces "lumpy jaw" in cattle and is not frequent in man, especially in this country. It is not uncommon, however, in countries where camels are used as domestic animals. It is sometimes seen in cattle in the United States and now and then in man in cattle districts.

Syphilis. The consensus of opinion seems to be that syphilitic infections are far less numerous than either pyogenic or tuberculous infections. In the author's opinion this is especially true in regard to the alveolar process, although the mouth seems particularly favorable to other lesions of syphilis. In patients who seem to be syphilitic, recovery is

much slower, the infected tissue being more sensitive and persisting in showing inflammation long after other patients with other infections have recovered. The characteristic thickening of the periosteum and the gummata of syphilis can be felt over the diseased bone in the neighborhood of the apices of the teeth, either on the buccal or the inner surface, or both. Gummata in the periosteum must be distinguished from hardened lumps at the apex of dead teeth, or exostosis of bone. Gummata usually appear, however, on the septum of bone between the roots, rather than over them. This is because syphilitic bone is more apt to be in the cancellous portion of the body or between the roots. These conditions are rare, however, in comparison with pyogenic and tuberculous infection. Local treatment is practically the same in all infections excepting that it must be continued longer in syphilis. Syphilitic infection may be either congenital or acquired. The congenital form appears more frequently in the bones of children and particularly in the long bones, but the acquired form frequently shows in the bones of the head and face, the alveolar process and maxilla being no exception. With our present incomplete knowledge, however, syphilitic alveolitis is not easy to distinguish from tuberculous alveolitis.

Osteomyelitis. In considering osteomyelitis, which is pyogenic, it is to be remembered that in a typical case the seat of trouble is in the marrow of one of the long bones. It is considered that the infection comes from the blood, and the spread of infection is rapid, destruction and pain increasing as long as there is no exit for the pus and other products of inflammation. Early interference is therefore imperative. The same applies to an abscess at the apex of some dead tooth, or an infection under the gum tissues, either from the blood or from a lesion at the alveolar border. Very acute and painful infections about the alveolar process imply that the pus is confined at some depth below the margin of the gums. If the infection were nearer the gum margin, either in the socket or on the alveolar process, the discharge would either not be confined or would make its exit at an early stage of the disease, giving comparatively little pain in either case. The infection remaining, however, continues its destructive work, and a chronic stage of suppurative alve-

olitis or true pyorrhea alveolaris is the result. If not interfered with, this condition may continue indefinitely, now and then assuming an acute stage when new foci become infected, quieting down again when the sinus is opened to the surface. But each time when this occurs there is loss of more bone in the alveolar process or in the deeper cancellous portion, often extending into the body of the jaw, and many times into the antrum. This destruction continues slowly or rapidly, according to the acuteness or chronic activity of the disease, until the tooth or teeth are lost. When the tooth is out, if the infection is not mixed with other germs, tuberculous or syphilitic, healing becomes prompt and complete in the normal time for the building of bone structure, that is, in two or three months. Under proper surgical treatment, however, healing can be rendered just as prompt and complete, and the teeth retained and restored to usefulness, provided the dead and infected bone be removed before the foundations of the tooth are too greatly destroyed.

Tuberculosis. In considering tuberculous infection as a cause, the author's experience leads him to believe that alveolitis in all its stages, after its initial lesion, is more largely due to this infection than any other. The action of tubercle bacilli on bone is particularly applicable to carious alveolitis. The "infectious granuloma" of Virchow, which plays so large a part in the slow destructive process in caries of bone, is the effort on the part of nature to repair the damage done by tuberculous or other infection, but the granules also become the seat of infection and serve as a further means of increasing the progress of the disease, especially the tuberculous tract. Carious necrosis in alveolar process and jaw bones seems exactly the same in character and extent as this infection in other bones.

Treatment. In the first place, in extensive cases, the tissues will need to be anesthetized, a five to ten per cent. solution of cocain being injected into the pockets. If the tissues are very sensitive, a weaker solution can be injected into the gums, the same as when teeth are extracted. The periosteum is very sensitive, but bone is not so, and dead bone not at all so. The use of cocain must be determined by the conditions, the author using it as sparingly as possible, for the reason

that if enough is used to produce anesthesia, it usually produces a condition of sleeplessness, if it does not prostrate the patient for a day or two. Usually the cocain can be postponed until the point of curetting and burring.

Next, all calcareous deposits must be thoroughly removed, and the teeth and roots polished with an orange stick and pumice, floss, disks, or brush. Experience shows that scratches and grooves on the roots from instruments are nearly always present, although they should not be. These scratches when under the margin of the gums do not cause the roots to decay nor prevent the tissues from becoming healthy; but calcareous deposits remaining, however slight in amount, will continue to irritate and increase, resulting in a repetition of the various stages of the disease, namely, initial lesion, increased inflammation, infection, and destruction of bone.

One of the most important parts of the treatment consists in teaching the patient how to keep the teeth free from calcareous deposits. If tartar is not allowed to form about the gums, it will not form below, and the disease is prevented; otherwise it is likely to return. After removal of deposits comes the removal of necrosed bone. No repair is ever complete unless this is done. It is oftenest done, however, by nature herself, without intentional aid from outside.

By a conscious effort to assist nature, recovery can be induced in many cases which would otherwise end unfavorably. The progress of tuberculous infection in bone is so slow that many patients, even if not entirely cured, may be much relieved, in that the disease becomes quiescent, and the affected teeth, which otherwise would be lost, remain useful for years.

The conscious effort referred to consists in the use of delicate bone curettes and suitably shaped burs for removing dead bone from the necks and roots of affected teeth. Examination should first be made about the neck of every tooth with a delicate probe—one of the bone curettes is usually good for this purpose, but a more delicate instrument, like a smooth broach, is often necessary. The sense of touch readily reveals the presence of bone not covered by soft tissue. When such is present there is very little, if any, sensitiveness,

whereas if the gums or periosteum still cover the bone, the patient quickly responds to the pain, and the touch reveals the difference between live and dead bone. No matter what one may believe as to the causes of the disease, the fact remains that in the mildest cases of alveolitis in its second or chronic stage there is always more or less death of the bone about the teeth, and the dead and diseased tissue should be removed in order to give nature most assistance. The third or necrotic stage is that in which the alveolar process is more deeply involved, the necrosis usually progressing along the root in one tract, until near the apex, then gradually encircling the root, also continuing its ravages into the maxilla. In the upper jaw the infection often goes into the antrum, now and then into the floor of the nose, and many times destroys large sections of the cancellous portion of the maxilla.

In the treatment of these cases, packing is not called for, except in instances of extensive removal of tissue, such as curetting the antrum or the removal of considerable portions of the body of the bone. If systemic treatment is demanded it should be directed toward the restoration of normal health by such means as the elimination from the diet of food which does not become wholly digested and assimilated, and the copious drinking of pure water. If the local trouble is complicated with other diseases of moment, the general practitioner or specialist should take charge of these.

Tic douloureux. Besides these deep-seated extensive cases, there is another class which calls for knowledge of local pathology and great keenness of diagnosis. These cases are non-suppurative, and attended by more or less neuralgic pain, sometimes a matter of small discomfort, again reaching the magnitude of tic douloureux. They usually occur about a perfectly good tooth, and there is no evidence of inflammation, either on inspection or percussion. The one symptom which calls attention to them is entirely subjective, that is, the patient complains of discomfort or pain in the neighborhood of the tooth. The tooth affected is usually next to one more deeply affected or next to the space where one has been lost. With a smooth broach-like probe inserted closely to the tooth, some place will be found which is not sensitive,

usually approximating the space where the adjoining tooth was, or the tooth more deeply affected. The bone is found nude of periosteum and eburnated, that is, abnormally hard. This hardened condition is easily detected by the touch. The bone is very hard to cut even with a bur, and is not sensitive. The treatment consists in the removal of the eburnated bone with a curette or bur—the bur is the better.

Disease of the periosteum, wherever found, is usually accompanied by neuralgic pains. In view of this fact, the author is led to believe that tic douloureux might be due to a disease of the periosteum, starting as above described, and continuing even after all the teeth have been lost.

Diagnosis. The diagnosis of chronic cases of alveolitis needs suitable instruments, sensitive touch, and great care, and the treatment, in addition to this, requires a perfect knowledge of the anatomy of the structures and their pathology. The operator must be capable of opening and properly treating the antrum of Highmore, of knowing whether this cavity is diseased beyond its connection with the teeth, or whether it is diseased at all, and of handling the patient under collapse, either from shock or local anesthetics. Further, the operator should be so in touch with his patient and the extent of the operation as to know whether the operation should be performed under general or local anesthesia, and whether it should all be done at once or at intervals of a few days or weeks; for general or systemic complications from secondary and acute infection may occur any time.

After giving the history of one hundred and twelve cases treated, the author speaks of the laws of regeneration, which do not permit of complete healing of bone tissue inside of several weeks at the shortest, but often require several months, so that patience and careful watching are necessary on the part of both patient and operator.

Regeneration. After curetting and burring has been done, the cavities should be washed out with a warm antiseptic solution to remove the cuttings. The blood should be allowed to clot in the cavity, being careful not to disturb the clot so long as it remains aseptic. If there is a tendency to formation of pus, the wound should be washed out every one, two, or three days, according to conditions,

and if pus continues after ten days, a second, third, or even more attempts must be made to remove the offending material.

An aseptic blood-clot assists in the healthy repair, for in it is formed the granulation tissue, which is the second stage of the building of new tissues. Any disturbance to these granules is a hindrance to repair, hence packing is uncalled for.

The formation of granulation tissue is followed by its gradual change into tissue of the kind from which the granules sprang. This process continues until the wound is healed. The hindrances to this normal process are foreign bodies, dead or dying tissue, and the presence and increase of bacteria. Nevertheless, there is a continuous and never-ceasing effort to extrude or to tear down and carry away any foreign body.

The new granular tissue thus endeavoring to envelop the diseased or dead tissue is called the involucrem. Dead tissue thus completely enveloped is attacked from every point, and often an enemy thus attacked can be destroyed, whereas, if only partly surrounded, it would hold its ground.

This process is one of the most common things to be seen in the human mouth, especially in patients who have been or are being treated for alveolitis. When the crown of a tooth has disappeared, the involucrem begins to grow over the edges of the root, and at times a portion of the root may be completely enveloped and finally become absorbed. Inflamed gums, due to irritation from tartar or other causes, constitute an attempt to envelop and destroy the enemy, and replace lost tissue. The approved surgical treatment is to remove all dead or dying bone, if it be practicable. It must be borne in mind that the process of regeneration of bone in these cases is accompanied by acute inflammation of the surrounding tissue. The newly forming bone is soft and yielding; the callus does not show much tendency to harden for three or four weeks, and does not become ossified for six or more weeks. Often, therefore, after the removal of bone about the roots, the teeth are looser than ever, and at times need splinting with wires to other firmer teeth, the splint remaining until ossification is completed, when the teeth will become firm and useful, provided there remain in the begin-

ning enough live bone, periosteum, and endosteum for the purpose of regeneration.

[*Oesterreich.-Ungar. Vierteljahrsschrift für Zahnheilkunde*, Vienna, October 1908.]

ALVEOLAR PAPILLOMATA AND ALVEOLAR FISTULÆ. BY DR. ALFRED NEUMANN-KNEUCKER, VIENNA.

If a small papilloma is located on the gingiva in proximity to the apex of the root of a tooth, its similarity with the typical granular nodule as produced by alveolar fistula may suggest the latter and lead to wrong diagnosis. The papillomata are excrescences of different size, each of which represents a simple or branching papilla built after the type of epidermal or mucous papillæ and covered with epithelial tissue of varying thickness. The connective tissue in the papillæ is generally richer in cells and vessels than normally; the epithelial layer also may be considerably thicker although otherwise its character corresponds to the epithelial tissue of the swollen portion. The papillomata take their origin from the normal papillæ of the epidermis and the mucous membranes, the papillæ increasing not only in size but also in number.

Granulation tissue, however, consists of small round cells lying closely together, with very little basic mucous substance, and numerous wide capillaries which are arranged parallel to each other and vertically to the surface, where they are bent over in the form of loops.

After citing three cases which were successfully treated, the author quoting from Partsch's article in Scheff's Handbook gives the following macroscopic description: The papilloma, a benign neoformation of epithelial nature, appears as a broad or petiolate reddish gray eminence which rarely exceeds the size of a lentil, and whose surface is plainly characterized by the strongly developed papillæ. It feels rough on palpation and resists mechanical influences, to which its surface is exposed, owing to the thick epithelial covering and rarely leads to ulcerous decay or hemorrhage.

In places where the mucous membrane is exposed to greater pressure, the surface not infrequently changes into an extended wart-like area. Cauterization is generally of little

value. The rapid and certain method of cure is surgical removal by means of scissors and pincette, with subsequent suture.

For differential diagnosis the following points are to be noted:

(1) Minute inspection of the mucous membrane of the gingiva.

(2) Probing, if feasible, of the apparent orifice of the fistula.

(3) Examination of the tooth involved, in regard to its vitality, either by means of the modern electric examination, by removal of old fillings or opening of the pulp-chamber, etc.

(4) Radiographic examination.

[*Revue Générale de l'Art Dentaire*. Paris, December 1908.]

FILLING ROOT-CANALS WITH COPPER POINTS. BY DR. SIFFRE, PARIS.

The process advocated by the author refers to single-rooted teeth, incisors, canines and sometimes bicuspsids, also, if convenient, to the anterior canals of molars. Copper points are easily handled, sufficiently elastic, and can be introduced into the smallest canals. After the pulp-chamber is opened the author introduces the point, and by moving it to and fro works perborate of soda in glycerin into the canal. The same operation is repeated with a paste of glycerated perborate of soda and a fiber of cotton saturated with sulfuric acid. Then the canals are cleansed with cotton fibers soaked in 90 per cent. alcohol, dehydrated and filled with chloropercha mixed with eugenol. The points are trimmed with crown scissors, left in the canal and covered with gutta-percha. At the second sitting the gutta-percha is removed with a little chloroform, the antiseptic treatment repeated if necessary, and the canals are again filled with chloro-percha and eugenol, to which some other antiseptic such as iodoform, trioxymethylin, formol, or phenol may be added.

[*Lancet-Clinic*, Cincinnati, January 9, 1909.]
ODONTOMATA. BY DR. B. M. RICKETTS.

Odontomata, new formations arising in connection with the teeth and presenting the structure and appearance of a tooth, have been found in animals as well as in man. They are of rare occurrence, harder than bone, but not as hard as normal tooth tissue;

less frequent in the upper than in the lower jaw, and said to have a slight tendency to undergo sarcomatous degeneration. The density of each varies considerably, as does the size and shape; they are supposed to be single, yet one case has been reported in which several teeth were involved. The complications arising from odontomata consist in tumefaction, abscess in the antrum, occlusion of the nares, necrosis of the surrounding bony structures, fistulæ into the nose, the mouth, the antrum or upon the cheek, in more or less severe pain and tenderness about the parts affected, and in infection and rise of temperature dependent upon the destruction of tissue. Relief is not sought until one or more of these conditions arises, because the growth alone usually causes no discomfort, unless it be very large. The tumefaction may be considerable, without inconvenience or perceptibility. The diagnosis is usually difficult without exploration or the radiograph. With the use of the X ray alone the character of the growth may not be determined. The conditions to be considered in the order of their frequency are: Unerupted tooth, osteophyte, osteosarcoma, odontoma.

In non-eruption there is an absence of the tooth, with a corresponding space from childhood on, without any increase in size of the neoplasm. There is seldom pain or tenderness with or without pus. The X-ray diagnosis is positive. A radiograph of the jaw in which one or more teeth are absent since dentition, would show this condition in many persons who had never suspected it.

With an osteophyte the proper number of teeth may or may not be present. The neoplasm may be irregular or smooth and slow in its growth. No special pain or tenderness is felt. The X-ray diagnosis is positive. Osteosarcoma is rapid in its growth, with or without the proper number of teeth. There is tenderness and pain on pressure, with early softening of the bony structure involved. The X ray is unsatisfactory and reveals nothing as a rule.

The odontoma rarely develops independently of tooth tissue, which may be but a part or all of it. The tooth may or may not be seen. If visible, the exposed end may not give evidence of disease; if not visible, the tooth may never have erupted, or it may be in the process of eruption. The process of

growth may begin at any time during fetal life or after birth. The development is slow and usually painless, unless it be complicated with an irregular surface. It usually occupies the crown of the third molar before eruption, if that tooth is involved.

The cases cited by the author show that operative interference is indicated, sometimes with opening into the antrum, which is readily occupied by granulating tissue without generation of a fistulous tract.

[*Revue Générale de l'Art Dentaire*, Paris, December 1908.]

THE RELATIONSHIP BETWEEN GINGIVO-DENTAL IRRITATION AND REGIONAL ECZEMA IN THE ADULT. BY HENRI-EM. CRAMER.

The influence of dentition on eczema in infants has been established beyond doubt. The author attempts to demonstrate the relationship between dental irritation and eczema in the adult, defining eczema as acute, subacute, itching, papulo-vascular or ulcerative dermatitis sometimes complicated with secondary inflammation and even chronic lichenification. The fifteen cases observed and treated by the author led to the following deductions: The existence of a relationship between eczema and dental lesions is experimentally proved by the recrudescence of the

reactions noted at the level of the eczematous plaques, which immediately follows any intervention bearing upon the maxillo-dental system. In one case the dental treatment was followed first by pruritis, then after the second treatment by slight eczematization; in another case a difficult extraction produced immediate pruritis and a new eruption. The dental origin was also proved by the lasting subsidence of the reactionary phenomena which quickly follow the short recrudescence noted after intervention. In one case, the treatment was immediately followed by an enlargement of the eczematous plaque, which improved rapidly eighteen days after the intervention. Dental irritation alone is rarely the cause of eczema; generally other irritative factors, such as dyspepsia, are found at the level of the cutaneous lesion. The existence of eczema of dental origin can also be demonstrated by way of therapeutics. Eczemata that have been unsuccessfully treated with bandages and salves will yield to this same treatment after dental treatment. Of fifteen cases treated seven manifested immediate improvement of the eczema and the pruritis, five were followed by a recrudescence of the various symptoms, which subsided rapidly, three developed new plaques around the old lesions but disappeared without any tendency to persist.

PERISCOPE.

To Stop Hiccough.—Have the patient take a piece of sugar dipped in vinegar and ask him to chew it rapidly and swallow, which will immediately stop the hiccough. This simple method never fails even in case of hysterical hiccough, which yields to no other treatment.—*Annales Dentaires*.

Which Teeth Shall We Extract?—(1) Abscessed teeth posterior to the second bicuspids, upper and lower, for rarely free access to the root-canals can be obtained, allowing of a thorough cleansing and pus-drainage. We cannot resort to alveolotomy very well, inasmuch as it is difficult to determine which of the roots is abscessed.

(2) All frail roots, decayed considerably

below the gum margins—thus precluding the possibility of banding and crowning.

(3) Where a case is presented with a single tooth on one side of the upper arch, for which a denture is to be made, I invariably extract that tooth. In the lower arch, on the contrary, I consider it most advisable to retain even a single tooth, even though it be loose, for, by clasping, sufficient retention is given until the patient becomes accustomed to wearing a denture. In this way, by the time the tooth necessitates extraction, the presence of a foreign body in the mouth will have become less objectionable to the patient.

(4) Supernumerary teeth, in or out of the arch.

(5) Certain irregularly erupted teeth

which cause disfigurement, as, for example, canines which erupt only partially, allowing the bicuspid and lateral to close up the space. In such cases we cannot readily bring the "vagrant" to its proper position, and I advise extraction.—J. M. SCHWARTZ, *Odontologist*.

Open-Bite Malocclusion.—Of all the forms of malocclusion the most difficult to treat is the open bite. This condition is the outcome of some form of nasal obstruction. The mouth is kept open so that the patient may breathe more freely. This position will sooner or later change the mechanical action of the depressor agent of the mandible, namely, first, the platysma myoides muscles; second, the digastric muscle; third, the mylo-hyoid muscle; fourth, the genio-hyoid muscle. These muscles, assisted by gravity, that is by the weight of the jaw, keep the mouth open, while the anterior segment of the temporal muscles, the masseter muscles, and the internal pterygoid muscle antagonize the depressors of the mandible. This abnormal action of these opposing muscles will be eventually instrumental in changing the development of the mandible.—M. N. FEDERSPIEL, *Dental Review*.

How to Make Gold Fillings.—There are four fundamental principles that must always be borne in mind in making gold fillings, or indeed fillings of any kind: First, the outline form; secondly, the resistance form; third, the retentive form, and fourth, the convenience form.

The outline form involves the doctrine of extension for prevention and the esthetic form. If we are to accept the micro-organic theory of decay, then we must, if we are to be honest with our patients and with ourselves, make our fillings in such way that the cause of the primary decay will not be operative after we have made our filling. If we believe that the cause of the decay lies in the inherent weakness of the tooth, then it matters little how we prepare our cavities, or how we fill the tooth, for if it were so weak in its perfection that it could not withstand caries, surely it will not be able to hold out long after it has been filled, even though in a perfect way. But we do know that teeth that have decayed and have been filled in a scientific manner have resisted the influence of caries for years, even though the other teeth in the same mouth have been subject to repeated attacks. And we also know that fillings that have been made without sufficient extension have repeatedly failed.

The outline form also involves the esthetic form, and it is our duty to make every filling as beautiful as possible, or better, perhaps,

as little disfiguring as possible, commensurate with the preservation of the tooth.

The resistance form is that form that must be imparted to a cavity in order that the filling may be able to resist the stress that may be brought upon it during mastication; this form is to be given to a cavity after a careful study of the occlusion and of the amount and direction of the stress.

The ideal retentive form is a square box, and the nearer we approach this ideal the more nearly perfect will be our cavity. The rule demands flat seats and parallel walls.

The convenience form is a most important consideration in filling teeth with gold. For we cannot perfectly fill a tooth with gold in which we cannot obtain perfect access to every portion of the cavity.—J. V. CONZETT, *Dental Digest*.

Porcelain Technique.—After the preparation of the cavity in the manner required for porcelain fillings the platinum for the matrix should be heated with a blowpipe flame. Large burnishers are then used together with wet spunk, to partially adapt the platinum to the walls and floor of the cavity, after which the matrix *in situ* is filled and packed with gum camphor.

In approximal cavities a thin, spatula-like instrument is forced between the adjoining tooth and the gum camphor. With the gum camphor still in the matrix, the matrix is carefully removed and held over the flame, thus burning out the gum camphor. It is advised to do less jarring than was done formerly. Small squares of blotting paper will be found extremely useful to take up the excess of moisture.

It is also noted that much re-burnishing is unnecessary and that in most cases the porcelain if improperly manipulated will pull away from the matrix, but that the latter is seldom warped; where swaged matrices are used, the patient may be dismissed, provided that the proper shade of material is on hand, and the furnace is equipped with a pyrometer. In contouring, the amount of distilled water determines the ease with which the body may be shaped up.

After removing the matrix from the finished filling, if necessary, it may be undercut with small carborundum stones or wheels, but it is recommended that the filling be invested in wax, exposing the surface of the filling which joins the tooth, including the margins, and covering with hydrofluoric acid for a period of from eight to twenty-five minutes, after which the filling must be boiled in a test tube in a strong solution of bicarbonate of soda. This last procedure is

of the utmost importance, as a mere washing of the filling will not stop the action of the acid. The filling or restoration may then be cemented in the usual manner.—CARROLL H. FRINK, *Dental Brief*.

To Improve the Color of Pink Rubber.—Take a piece of absorbent cotton, saturate it with sulfuric acid, and rub it over the prosthetic rubber piece until it is black. Wash off every trace of the acid. The resulting color is a perfect imitation of the natural gums.—*Le Laboratoire et le Progrès Dentaire*.

Pressure Anesthesia.—In applying pressure anesthesia through the opening made or otherwise, and without any special instrument or syringe, follow these instructions: Bore a hole with a small bur through the enamel at some convenient point, preferably at the neck of the tooth. With a bit of cotton fill the hole loosely, and then saturate the cotton with the cocain solution and keep it protected from saliva. Then stick a small ball of gutta-percha on the broad flat face of an amalgam plugger and, warming just a trifle, push it down over the hole as hard as you can. After a moment the hole may be drilled deeper, and if sensitivity is reached, the operation must be repeated as often as necessary.

On reaching the pulp an exploration will quickly determine whether it is numb all through or not; if not the same *modus operandi* may be repeated, carrying the anesthesia as much further as required.—R. B. TULLER, *Dental Digest*.

The Production of Eczema by Salol in Dentifrices.—Until about twenty years ago tooth-powders consisted chiefly of chalk, soap, orris-root, cuttle-fish bone, and other mechanical agents slightly aromatized with various pleasantly tasting oils, and were used solely on account of their mechanical properties. With the introduction of salol, the peroxids, oil of wintergreen, and other antiseptic agents it became the fashion to incorporate them with the older bases, and in the case of salol particularly a large demand was soon created for a liquid dentifrice from which an antiseptic rather than a mechanical effect was obtained. At the present time salol, or a by-product in its manufacture, is probably the chief constituent of most dentifrices, and it is contained in many tooth-powders. It is of interest, however, to draw attention to the fact that salol occasionally causes more or less serious inconveniences when used in this manner. As pointed out by M. Dubreuilh in the *Journal de Médecine de Bordeaux*, dentifrices containing salol frequently produce

eczema on the lips and in the buccal cavity, extending at times over the face beyond the lips and causing unsightly appearance and local irritation. In such cases it is necessary for the patient to cease to use dentifrices containing salol, and if this be done the symptoms will soon disappear. Salol readily splits up in contact with moisture into salicylic acid and phenol, and without doubt it is to these constituents individually that it owes its antiseptic properties. The liberation of comparatively large quantities of these antiseptics in the mouth in the free state, when repeated once a day or more frequently, is therefore liable to produce unpleasant consequences.—*Lancet*.

Causes and Etiology of Pericementitis.—Broadly speaking, the predisposing causes of pericementitis are such conditions as jeopardize the integrity of the dental pulp. To enumerate these conditions in the order of their importance as agents producing injurious influence, I would mention as the most prolific source the molecular disintegration of tooth tissue; the too close proximity of a filling material; traumatism such as produced by a blow, or in consequence of regulating operations; loss of an antagonizing tooth and the injudicious use of arsenous acid. The agents which induce injurious influences on the pericementum, producing pockets or spaces between the alveolar wall and the root of the tooth, are deposits of salivary calculus, ill-fitting mechanical appliances, overhanging portions of fillings, and any foreign substance that becomes lodged between the gum tissue and the neck of the tooth. In addition to the foregoing we have these influences acting through the circulation in consequence of a general functional or nutritional disturbance, which in turn induces an impairment of the resistive forces of the pericemental tissues. It is a well-known clinical fact that there are many more occurrences of acute pericementitis during the period when colds are prevalent. It is indisputable that this common malady, which is a disease of the respiratory tract, reduces the vital resistance of the tissues, predisposing them to the action of pyogenic organisms which find their way to the weakened parts through the circulation. This observation is supported by Scherer's investigation, the results of which he published some years ago, and which are to the effect that certain climatic and atmospheric conditions induce systemic conditions which favor the development of the diplococcus pneumoniae. While much light has been shed on the etiology of pericementitis, there still remains much to be explained. We know from

clinical experience and observation that the larger percentage of pericemental disturbances may be traced to putrescent pulp tissue, and, on the other hand, there is that type of the disease which is most difficult to treat, as far as alleviating the pain is concerned, that cannot be traced to any perceptible local condition. We ascribe its cause to disease-breeding organisms reaching the pericemental tissues through the circulation.—J. CLARENCE SALVAS, *Dentist's Magazine*.

Conditions Indicating Banding.—Whether a crown should be banded or not, depends on the following conditions: First—Are the gums and mouth in a healthy condition? Second—Is it a normal occlusion or not? Third—What is the condition of the root; will it present a solid end for the crown to come against, and is the enamel that extends under the gum and will be left if the root is not banded, in good condition entirely around the end of the root, and is it covered by perfectly healthy gum? Fourth—What is the location of the tooth in the mouth?—H. L. BEAL, *Dentist's Magazine*.

Urine Analysis in Pyorrhea Alveolaris.—I have lately been impressed by the coincidence of pyorrhea alveolaris and sugar and albumin in the urine, and the disappearance of these symptoms when the condition of the teeth was cured. I am collecting two hundred cases of pyorrhea alveolaris, with urine analysis before and after the pyorrhea is cured. I wish to ask other practitioners who are interested in this subject, to kindly send me any results which they have in the same line, that is, when they find sugar and albumin in the urine, will they have the teeth investigated and find out how many of such patients have pyorrhea alveolaris? This is a subject of interest to all of us, and I am sure the results will amply repay us for the trouble involved.—WILLIAM MARTIN RICHARDS, *Jour. Amer. Med. Association*.

Dental Caries and Dyspepsia.—One of the most common causes of aberrant dyspepsia is that which, for some extraordinary reason, is most commonly overlooked; so common is it, indeed, that one feels almost ashamed to mention it. I mean dental caries. The teaching of the schools, and I say this without any implied reflection, tends to the too exclusive cultivation of the obscure in diagnosis and the heroic in treatment, with the sad result that the obvious and commonsensical become overlooked. Thus it happens that patients are suspected to be suffering from cancer, gastric ulcer, esophageal stric-

ture, hepatic, pancreatic, and even splenic disease, when a few visits to a competent dentist will cause the disappearance of all their symptoms. We talk glibly of the gastrointestinal toxins and their nefarious consequences, but we appear to think of them as lurking brigand-like in the inaccessible rugæ of the small intestine, when their real habitat is the commonplace cave of a decaying molar. That "washing in Jordan" should never be a popular proceeding with patients is comprehensible, because patients are generally in an epic mood; but why doctors should avoid it as a prescription is less obvious. That the avoidance frequently impairs professional credit is a matter of common experience.—LEONARD WILLIAMS, *Hospital*.

The Production of "Black Tongue" by Hydrogen Dioxid.—The pathological condition known as "black tongue" appears to be due to various causes, some of which have not yet been determined. When found in cases of glycosuria it has been ascribed to the action of parasites, particularly *saccharomyces lingua pilosæ*. In a recent number of *Les Nouveaux Remèdes* it has been shown by M. L. Bizard that in many cases this phenomenon is caused by the use of hydrogen dioxid as a mouth-wash. He cites the case of a smoker who used a mouth-wash daily for eight days consisting of a tablespoonful of hydrogen dioxid in half a glassful of warm water. A marked blackening was then found on the dorsal surface of the tongue, but on ceasing the use of the mouth-wash, the coloration disappeared in a few days. The patient was in good health except that an examination of the tongue showed that the lingual papillæ were hypertrophied. The same effect was produced in the case of two patients undergoing mercurial treatment by the injection of gray oil, who were in the habit of rinsing the mouth with hydrogen dioxid. It was at first thought that the color was due to the action of the hydrogen dioxid on the mercurial saliva, but hydrogen dioxid alone, as has been shown, may produce the same effect. As hydrogen dioxid has now come into general use as a mouth-wash these observations are of great interest and value. Apart from the blackening of the tongue which may result from a too free use of the preparation, the question arises whether the general employment of antiseptic mouth-washes and dentifrices is advisable in healthy persons. When decay is known to exist there is no doubt that a moderate use of antiseptic agents tends to prevent the spread of the invading organisms. But when the mouth is in a healthy condition it would seem preferable to rely upon clean-

liness rather than on antiseptics. The bacterial flora of the mouth may contain organisms that naturally tend to preserve it in a healthy condition, but the continued use of antiseptics is calculated to destroy favorable as well as harmful bacteria.—*Lancet*.

Discoloration of the Teeth and its Treatment.—A most efficient and safe bleaching liquid is Merck's perhydrol of 100 per cent. which yields excellent results. The decayed dentin in the crown and in the canal is removed, preferably with excavators of gold or platinum. If ordinary excavators are used, care must be taken that they do not oxidize. The cavity is frequently rinsed with magnesia water. Cotton saturated in perhydrol is placed into the cavity and sealed in with oxychlorid cement, repeating this operation daily. The flask which contains the perhydrol is covered with wax up to the neck; it must be sealed with molten wax after every use, and kept in a cool place inside the metallic tube in which it is sold.—GONZÁLEZ KUKAY, *La Odontología*.

The Dittmar Method of Making a Cast Gold-Shell Crown.—A band of 34-gage 24-k. gold is made and accurately fitted to the prepared root in the usual way. Thirty-four gage pure gold is used because it is thin enough and soft enough to be most accurately modeled to the form of the root, which is extremely important. If the stump has been trimmed up to a slight taper, as it should be, the 34-gage gold will stretch a little and thus hug the root closely beneath the gum margins.

This band is now slit down the sides in numerous places equal in depth, so that when the divisions are turned in to the center, lapping one over the other at that point, the top is closed. Or if preferred the band may be capped by soldering on a flat piece at the right height to allow for the addition of the occlusal thickness and the cusps. When this has been accurately adjusted to the stump, add on to the top enough modeling compound to get a good bite, together with contact of the approximating teeth. The crown should come away with the modeling wax, then fitted exactly in place. If not it must be removed from the stump and carefully adjusted in the compound.

This shell should then be filled up with the silicate casting investment, and the rest with plaster as usually in making up articulating models. Having secured articulating models, soften and remove the modeling compound and then with a small brush oil the plaster mar-

gin around the crown, also the sides of the approximating teeth.

The next step, after the gold is entirely clean, is to build up a top and lateral contour with Taggart or other suitable inlay wax. This is readily done by having the wax melted in a little dish and applying it with a fine camel's-hair brush to the thickness desired on all sides and on top of the gold. Then by closing the articulator with the warmed wax the impress or bite is taken of the occluding teeth, and the necessary carving and occlusal shaping up may be done; also the contouring on all sides, painting on more wax or trimming away and smoothing and polishing up until a perfect tooth model is formed over the gold shell. None of the wax should impinge on the plaster. The oil is applied to prevent the wax that may accidentally touch the plaster from sticking.

The adjoining teeth may then be broken away, leaving the crown model standing alone. The approximal surfaces should be painted with a thin layer of wax to insure correct contact after finishing the gold. If this is not done the crown might be a little too narrow approxiamally. It is better to have too much than too little.

The more smoothly our model is finished up and polished, the better the cast will be. The model can then be sawed off from the plaster, and is ready for investment after inserting the sprue at the most available point. The shell of course remains in the model, and the molten gold takes the place of the disappearing wax.

When this crown is finished, it is about as perfect as it can be made, having a very thin edge to pass between the gum margin with gradually thickening walls at the occlusal portion. Twenty-two karat gold should be used for the casting, as it is harder and more durable.

A crown made in this way contains a great deal more gold than a shell crown made of plate in the old way; it is worth more intrinsically and artistically, and a good price should be charged for it.

For bridge supports such a crown is far superior in strength to the old-style shell crowns which being thin-plate yield more or less under stress. Any cast crowns are superior in this respect. There is no springing and yielding in the heavy work that may be put upon them. Such a weakness in the usual shell crown has been the cause of many a failure in bridge work; besides the old-style crown lacks in close adaptation to the shape of the root.—R. B. TULLER, *American Dental Journal*.

Dental Caries in Ancient History.—It is frequently assumed that the extreme frequency of dental caries is a purely modern phenomenon generally attributed to "modern dietetics" or to "the changes which the food of man has undergone during the last few centuries." Attention is called to the fact that 5000 years ago, in the time of the pyramid builders, dental caries and alveolar abscesses were at least as common among the adult aristocracy of Egypt as they are in Europe today, although dental caries was rare among the people of lower social status and almost unknown in children. Among several thousand children found in ancient Egyptian graves, only three instances of caries in deciduous teeth were observed.—G. ELLIOT SMITH, (Cairo, Egypt).—*Lancet*.

Chief Considerations in the Designing or Planning of Dentures.—(1) Size, color, and type of tooth, and gum (if any). (a) Structural kind of tooth: pin, tube, diatoric, gum tooth, etc. (b) Material of gum: porcelain, vulcanite, celluloid. (2) Position of teeth, for highest efficiency practicable. (a) Nearness to normal positions, relative to one another in the same jaw, and to those in the opposing jaw (bite). (b) Completeness of illusion at conversational distance. (3) Material required for a base-plate; considering chiefly harmlessness, strength, durability, cost. (a) Metal: Gold, dental alloy, etc. (b) Plastic: vulcanite, celluloid. (c) Combinations of above. (4) Stability or retention. (a) Adhesion from surface tension and suction. (b) Attachment to teeth and roots by clasps, etc. (c) Spiral springs, etc. (5) General design or form of the denture. (a) Outline of posterior and gum margins. (b) Treatment of surfaces. (c) Application of ornament.—D. M. SHAW, *Dental Record*.

Symptoms of Nitrous Oxid Anesthesia for Extraction of Teeth.—Before starting anesthesia with nitrous oxid the nasal inhaler is placed upon the patient's forehead, where it is held by an elastic band passing around the head; the mouth-prop is put in position, and the anesthetic started with the facial inhaler, the symptoms being carefully watched, which will appear as follows: (1) Drowsiness with cyanosis. (2) Inability to control voluntary muscles, as evidenced by the fact that the patient cannot open the eye when requested to do so, though the effort may be apparent. (3) Excitement in some nervous cases. (4) Loss of conjunctival reflex. This symptom cannot be relied upon, as often it will be absent, in which case it is well to raise the patient's arm, which will drop inert or show evidence of toxic spasm. These symp-

toms indicate that surgical anesthesia has ensued; however, the experienced anesthetist is more apt to be guided by the patient's breathing than by any other symptom. Stertorous breathing, caused by relaxation of the velum palati, is also an indication that surgical anesthesia has ensued.—ALFRED W. HALL, *Bur*.

Gold Dentures.—To make a double-plate gold denture secure a fusible metal die from the impression; on this die swage a 30-gage gold plate; solder the finishing wire to the edge. This plate is then used as a soft metal base-plate until the teeth are articulated, and all contouring of the wax is finished. Then slightly oil the lingual surface and pour a plaster core into it; when set, remove the core, make a matrix of plaster of Paris around it, and pour fusible metal over it. This gives a die of the lingual surface of the denture, into which the second or top plate is swaged.

The last plate swaged is then placed in position, and the case flaked in order to prevent any alteration in the bite. The plates are then removed from the flask and soldered. The top plate should be left one-eighth of an inch shorter than the bottom plate, as this leaves a ledge at the distal end upon which pieces of solder are laid. Retaining tags are then soldered to the buccal and labial surfaces to give attachment to the rubber; it is again placed in the flask, and the case is ready to be packed, vulcanized, and finished.—W. A. GIFFEN, *Odontoblast*.

Model of a Removable Bridge.—In case of a lower denture, in which the left molars, the second bicuspid, and lateral incisor are to be restored, and in which the lower left first bicuspid is partly attacked by caries, the following method of building a removable bridge is recommended: The first bicuspid is prepared and fitted with a crown that consists of two parts—a fixed base and a sliding hood. The surface of the fixed base has two crossed grooves, one disto-mesial the other bucco-lingual. The sliding hood is attached to the base by the bucco-lingual groove, which is deeply dovetailed. The disto-mesial groove, which is deeper than the bucco-lingual groove, has a passage for the pin which holds the metal bridge, to which three tube teeth—one bicuspid and two molars—are attached. The bridge plate is fitted with a semicircular ring, which embracing the necks of the first bicuspid and the canine on the lingual side supports an incisor tube tooth. After the apparatus is in place, the pin of the bridge is inserted in the disto-mesial groove of the first bicuspid, and the crown hood is fastened into the dovetail of the bucco-lingual groove.—DOUAT, *Bibliographie Dentaire*.

HINTS, QUERIES, AND COMMENTS.

DANGER IN HANDLING HYDROFLUORIC ACID.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—Your warning in a recent editorial on the dangers of handling hydrofluoric acid leads me to request publication of my experience with this drug. In pouring out the acid from the wax bottle into a small platinum dish wherein I was accustomed to place gold inlays recently cast, to clean them, I accidentally got a little of the acid under a fingernail. The pain was almost unbearable, and continued to become worse, although medical aid was sought and a number of different remedies tried. In looking over my medicines for a remedy I finally sighted a can of antiphlogistine, and as it promised at least a cooling effect for a time, the finger was thrust into this. The pain ceased almost instantly and did not recur. The finger was kept in this for about ten minutes. Subsequently a darkened spot showed under the nail, indicating where the acid had taken effect, but no further trouble has occurred. I now keep the acid in a wide-mouthed hard rubber jar with a screw cap—a traveler's inkstand I believe it is—and drop my inlays into that until the desired effect has been obtained.

Respectfully yours,

E. S. FULLER.

Piqua, Ohio.

TONSILLITIS AND TEMPORARY ANKYLOSIS FROM MALPOSED THIRD MOLAR.

A LADY came into my office to have her teeth examined; she could not open her mouth more than half its width. Upon examination, I found the upper right third molar erupting with the occlusal surface toward the cheek, and almost entirely covered with highly inflamed gum tissue, with muscular adhesions taking place, causing stiffening of the temporo-maxillary articulation, and enlargement of the right tonsil.

A history of the case revealed periodical attacks of tonsillitis.

Under somnoform I extracted the offending member and broke up the adhesions. The inflammation soon subsided and the stiffening disappeared. Eight months have now passed without a single recurrence of the tonsillitis.

N. B. FRENCH.

Clintwood, Va.

OFFICE HYGIENE.

It is quite possible that this field has been covered before, but at the same time it is well to bring up occasionally this very needful and always timely thought.

Can we not often plead guilty of negligence in this particular, even the best of us? To begin with, Do we always have the cleanest of offices? Are not the walls hung with bric-a-brac from one year to another without thoroughly cleansing? Do we not often hang upon our walls diplomas and other cut-and-dried objects, and in the center of the reception table a microscope—for whose edification, ours or the patients'? It certainly looks as if it were to impress our patients, and if they thought about it at all it would strike them as a queer ornament. Through the summers fur rugs and the same old winter carpets still remain on the same germ-laden floor.

Speaking of diplomas, they are all right in their place, in tin cans. Do you imagine that a patient enjoys looking at them or at cheap lithographs? Let us realize this, and we will all have a house-cleaning which will relegate this rubbish to the dust-heap, where it properly belongs. After getting our offices clean, including walls and floors, let us see that we have ventilation, not drafts. Of all the sins on the professional calendar, bad air is the worst. Fresh air entirely excluded! And especially when there are three or four doctors occupying the same offices at different hours does the need for ventilation become imperative.

If windows cannot be raised or lowered, there are ventilators to be had so arranged that air can come in and out without any draft. All hospitals and well-ventilated of-

fices have this precaution. The doctor then comes in for the most rigid cleanliness as regards himself, especially the smokers. It does not seem possible to me how the physician or specialist in surgery can possibly smoke during office hours. This habit, if indulged in, should be done at home, where their comfort cannot be disturbed and where no one can object. Professional men and women should strive hard for this worthy and laudable object in our offices, as men will thoughtlessly come into women's offices smoking, and seem surprised when asked to lay aside the weed.

Next in order an office coat and clean hands and smooth faces are requisite. Are we asking too much when we ask clean minds?

The next step, clean instruments, sterilized, and especially in minor operations on nose

and throat, also teeth; the absorbent cotton, instead of being thrown on the floor should be immersed in water, a receptacle being near at hand for that purpose. I had the pleasure of seeing a fellow worker use a vessel for this purpose, thereby doing away with the usual unsightly cotton-catcher or instead of throwing over the floor cotton dressings laden with the diseases of the mouth, nose, and throat.

It is said by an old writer and philosopher, that "The first impression should be good," if not, the second will not be likely to follow; and as cleanliness is certainly next to godliness, we can preach as good a gospel in our offices as the ministers in their pulpits, and so help toward that grand time when we shall eliminate sin, disease, and death.

FRANCIS G. CROUCH, D.D.S.

Atlanta, Ga.

SOCIETY NOTES AND ANNOUNCEMENTS.

DENTAL SOCIETY MEETINGS : March, April, and May.

MARCH.

FOX RIVER VALLEY (WIS.) DENTAL SOCIETY. Fond du Lac. March 9th.

NATIONAL DENTAL ASSOCIATION. Birmingham, Ala. Four days: March 30th to April 2d.

APRIL.

AMERICAN DENTAL SOCIETY OF EUROPE. Wiesbaden, Ger. Three days: April 9th, 10th, and 12th.

CONNECTICUT STATE DENTAL ASSOCIATION. Waterbury. Two days: April 20th and 21st.

EASTERN KENTUCKY DENTAL ASSOCIATION. Ashland. April 30th.

LOUISIANA STATE DENTAL SOCIETY. New Orleans. Three days: April 28th to 30th.

MAY.

ALABAMA DENTAL ASSOCIATION. Anniston. May 11th.

ARKANSAS DENTAL ASSOCIATION. Hot Springs. Three days: May 26th to 28th.

ILLINOIS STATE DENTAL SOCIETY. Danville. Four days: May 11th to 14th.

IOWA STATE DENTAL SOCIETY. Des Moines. Three days: May 4th to 6th.

KENTUCKY STATE DENTAL ASSOCIATION.

Crab Orchard Springs. Three days: May 17th to 19th.

LAKE ERIE (PA.) DENTAL ASSOCIATION. Cambridge Springs. Three days: May 18th to 20th.

MISSISSIPPI DENTAL ASSOCIATION. Natchez. Three days: May 11th to 13th.

NEBRASKA STATE DENTAL SOCIETY. Lincoln. Three days: May 18th to 20th.

NEW YORK STATE DENTAL SOCIETY. Albany. Two days: May 8th and 9th.

TENNESSEE STATE DENTAL ASSOCIATION. Memphis. Three days: May 25th to 27th.

VERMONT STATE DENTAL SOCIETY. Rutland. Three days: May 19th to 21st.

Examiners' Meetings.

ILLINOIS BOARD OF EXAMINERS. Chicago. June 10th.

MASSACHUSETTS BOARD OF REGISTRATION. Boston. March 3d to 5th.

MINNESOTA BOARD OF EXAMINERS. Minneapolis. March 9th.

NEW JERSEY BOARD OF REGISTRATION. Trenton. July 6th to 8th.

TENNESSEE BOARD OF EXAMINERS. Nashville. May 18th to 21st.

TEXAS BOARD OF EXAMINERS. Waco. June 14th.

FIFTH INTERNATIONAL DENTAL CONGRESS.

Berlin, Germany, August 23-28, 1909.

THE Fifth International Dental Congress will be held in the Reichstagsgebäude (Houses of Parliament).

The Hon. President of the congress is Geheimrat Prof. Dr. WALDEYER, director of the First Anatomical Institute.

Honorary members—Dr. NAUMANN, chief of the Medical Department of the Kultusministerium; Geheimrat Prof. Dr. KIRCHNER.

The business of the congress is conducted by the following committees:

1. Committee on Organization.
2. Berlin Local Committee.
3. Chairmen of the different Sections.

(1) COMMITTEE ON ORGANIZATION.

The Committee on Organization consists of fifteen members.

President—Privy Councillor Prof. Dr. WALKHOFF, München, Brienerstr. 47.

Vice-presidents—Prof. DIECK, M.D., Berlin, Potsdamerstr. 113. Prof. HAHN, Berlin, Lützowstr. 53. HIELSCHER, Köln a. Rh., Hohenzollernring 30.

Secretary-general — SCHAEFFER-STUCKERT, D.D.S., Frankfurt a. M., Kettenhofweg 29.

Secretary—KONRAD COHN, M.D., Berlin, Potsdamerstr. 46.

Treasurer—BLUME, Berlin W., Unter den Linden 41.

(2) BERLIN LOCAL COMMITTEE.

The Berlin Local Committee is composed of thirty-eight members.

Presidents—Professor GUTTMANN, court dentist, Potsdam. ROBERT RICHTER, D.D.S., Berlin, Victoriast. 23. Dr. P. RITTER, Berlin, Königgrätzerstr. 94.

Secretaries—WEIDMANN, Berlin, Bülowstr. 1. GUTTMANN, Berlin, Alexanderstr. 71. PURSCHE, Berlin, Rankestr. 30.

Treasurer—HELM, Charlottenburg, Berlin-erstr. 169a.

(3) CHAIRMEN OF THE SECTIONS.

The following twelve sections have been formed, all of which can hold sessions in the Reichstag building simultaneously:

SECTION I: Anatomy, Physiology, and Histology. *Chairman*, Dr. Adloff, Königsberg i. Pr., Weissgerberstr. 6-7.

SECTION II: Pathology and Bacteriology. *Chairman*, Prof. Dr. Römer, Strassburg i. E.

SECTION III: Chemistry, Physics, and Metallurgy. *Chairman*, C. Birgfeld, Hamburg, Alsterdamm 1.

SECTION IV: Diagnosis and Special Therapeutics; Materia Medica. *Chairman*, Prof. Dr. Michel, Würzburg.

SECTION V: Oral Surgery and Surgical Prosthesis. *Chairman*, Geheimrat Prof. Dr. Partsch, Breslau; Prof. Dr. Schröder, Berlin.

SECTION VI: General and Local Anesthesia. *Chairman*, University Lecturer Dr. Fischer, Greifswald.

SECTION VII: Operative Dentistry. *Chairman*, Prof. Dr. Sachs, Berlin, Kurfürstendamm 247.

SECTION VIII: Prosthetic Dentistry, including Crown and Bridge Work; Ceramics. *Chairman*, Prof. Dr. Riegner, Breslau.

SECTION IX: Orthodontia. *Chairman*, Heydenhauss, M.D., Berlin, Potsdamerstr. 121.

SECTION X: Hygiene of the Mouth and Teeth. *Chairman*, Dr. C. Röse, Dresden.

SECTION XI: Education and Legislation. *Chairman*, Dr. Ritter, Berlin, Königgrätzerstr. 94.

SECTION XII: History and Literature. *Chairman*, Hoffendahl, Berlin, Schöneberger Ufer 20.

During the week of the congress an official daily journal will be published in three languages (German, English, French). Editor: Konrad Cohn, M.D., Berlin, Potsdamerstr. 46.

An international scientific and industrial exhibition will be combined with the congress. Prof. Dr. Dieck, Berlin, Potsdamerstr. 113, Villa 3, has taken charge of the management of this exhibition, which is to be conducted on a large scale. [See notice on following page.]

At the last meeting of the Committee on Organization it was decided that the fee for membership be fixed at 25 marks (\$6.00), which sum will also entitle the holders of membership cards to a copy of the Transactions when published. For participation in the social functions additional cards will be issued by the Berlin Local Committee at a very low price.

A guarantee fund of 20,600 marks has already been subscribed, and it has been

decided not to call upon foreign visitors for financial or administrative support.

A hearty invitation is extended to all foreign *confrères*.

PROGRAM.

The following provisional program has been arranged:

SUNDAY, August 22d.

Meeting of the Fédération Dentaire Internationale. Evening: Reception of the guests at the Reichstagsgebäude.

MONDAY, August 23d.

Morning: Opening session. After the official addresses of welcome, four orators (German, English, French, and American) will speak on subjects chosen by themselves and important for the entire profession. The National Committees of the respective countries have each been requested to nominate their orator.

Evening: Reception given by the City of Berlin at City Hall.

TUESDAY, August 24th.

9 A.M.—2 P.M.: Sessions of the Sections.

Evening: Banquet in the halls of the Zoological Gardens.

WEDNESDAY, August 25th.

9 A.M.—2 P.M.: Sessions of the Sections.

Evening: Fiftieth anniversary of the Central Verein Deutscher Zahnärzte (Central Association of German Dentists) in the halls of the Rheingold.

THURSDAY, August 26th.

Second general session in the great hall of the Reichstagsgebäude. Subjects and questions will be discussed by speakers appointed by the different countries.

Evening—at the disposal of the congressists.

FRIDAY, August 27th.

9 A.M.—2 P.M.: Sessions of the Sections.

Evening: Reception in honor of the congressists given by the *confrères* of Berlin and of the province of Brandenburg.

Special train to Wannsee.

SATURDAY, August 28th.

9 A.M.—12 M.: Sessions of the Sections (passing of resolutions) and meeting of the Fédération Dentaire Internationale.

3 P.M.: Closing session. Acceptance of the resolutions of the Congress.

Evening: Farewell banquet at the Halensee Terraces.

On Sunday and after, groups of the congressists will visit German cities and universities.

The Bureau of the Congress will be opened four weeks before the opening of the congress. A postal, telegraph, and telephone office will be established, also refreshment rooms.

The size of the Reichstagsgebäude will render it possible for the different sections to meet simultaneously, so that the participants may hear lectures in different sections on one day.

In order to facilitate conversation between men of different nationalities, those *confrères* who speak English will wear a blue badge, those who speak French a red badge.

The Hamburg-American Packet Co. allows to members of the congress a reduction of 25 per cent. except during the height of the season.

The Berlin Local Committee will be pleased to procure lodgings for foreign colleagues and supply them with all information concerning their journey, their sojourn in Berlin, etc.

The prices of rooms in hotels vary from 2.50 to 30 marks per day (\$0.60 to \$7.00). All questions regarding this subject should be addressed to the president of the Local Committee, Professor Guttman, Potsdam.

In order to make the visitors acquainted with the sights of Berlin and its environs, ably conducted excursions have been arranged for. The scientific institutions of importance will also be open to visitors.

INTERNATIONAL EXHIBITION OF DENTAL SCIENCE.

In connection with the Fifth International Dental Congress in Berlin, August 23-28, 1909, an International Exhibition of Dental Science will be arranged, on a large scale, in the Reichstag building.

The progress of dentistry in all civilized countries cannot be better illustrated than by means of a systematically arranged, scientific exhibition.

The nature and extent of the proposed exhibition is evident from the following grouping:

GROUPS OF EXHIBITS.

I. Anatomy and physiology.

1. Comparative anatomy. (a) Anthropology and ethnology. (b) Comparative odontology including paleontology. (c) Anomalies of the teeth of animals.

2. Normal macroscopic anatomy of man (anatomy and development of the head, jaws, and teeth, including specimens of the jaws and teeth).

3. Normal microscopical anatomy.

4. Anomalies of anatomical development (anomalies of the development of the head, jaws, and teeth).

5. Physiology.

II. Pathology and bacteriology.

1. General pathology.

2. Special macroscopical pathology, including comparative pathology.

3. Special microscopical pathology.

4. Bacteriology of the mouth.

III. Surgery of the mouth and the jaws.

1. Surgical therapeutics, including narcosis and local anesthesia.

2. Surgical prosthesis, including obturators.

*IV. Orthodontia.**V. Preservative treatment of the teeth.*

1. Fillings. 2. Root-treatment.

VI. Prosthetic dentistry.

1. Plate work. 2. Crown and bridge work, including ceramics.

VII. Photography in dental surgery as a means of investigation and instruction.

1. Macroscopic photography. 2. Microscopic photography. 3. Stereoscopy. 4. X-ray photography. 5. Photography in colors.

*VIII. General dental education, post-graduate instruction, educational appliances.**IX. Hygiene of the mouth and the teeth.*

(a) From the scientific, and (b) from the social point of view.

X. History of dentistry.

Instruments, pict res, and in short, everything of historical interest for dentistry.

*XI. Dental jurisprudence.**XII. Literature.*

(a) Original works. (b) Periodicals.

The committee desires to be informed of the names of all public or private collections

containing specimens of general or special interest for dentistry.

The committee of the exhibition urgently requests each to use his personal influence to arouse interest in behalf of the International Dental Exhibition.

The committee will take every possible precaution to insure the safety of any specimens loaned.

Prof. Dr. DIECK,

Chairman Committee on Exhibits,
Berlin, Potsdamerstr. 113, Villa 3.

AMERICAN NATIONAL COMMITTEE ON FIFTH INTERNATIONAL DENTAL CONGRESS.

BERLIN, AUGUST 1909.

At a meeting of the Executive Council of the National Dental Association held at Pittsburg, Pa., Saturday, October 10, 1908, the following were appointed as the American National Committee, to forward the work of the Fifth International Congress and provide for the representation of American dentistry at that congress—to be held in Berlin, Ger., August 1909:

American National Committee.

Edward C. Kirk, Philadelphia, Pa., *ch'man.*

Burton Lee Thorpe, St. Louis, Mo., *sec'y.*

Truman W. Brophy, Chicago, Ill.

A. W. Harlan, New York, N. Y.

B. Holly Smith, Baltimore, Md.

G. E. Savage, Worcester, Mass.

Wm. Carr, New York, N. Y.

W. W. Walker, New York, N. Y.

J. D. Patterson, Kansas City, Mo.

Gordon White, Nashville, Tenn.

Chas. R. Turner, Philadelphia, Pa.

Chas. McManus, Hartford, Conn.

G. V. I. Brown, Milwaukee, Wis.

N. S. Hoff, Ann Arbor, Mich.

F. E. Ball, Fargo, N. Dak.

L. P. Dotterer, Charleston, S. C.

Eugene H. Smith, Boston, Mass.

Chas. L. Alexander, Charlotte, N. C.

COMMITTEE ON ESSAYS.

Edward C. Kirk, *chairman.*

Burton Lee Thorpe, *secretary.*

L. P. Dotterer.

COMMITTEE ON CLINICS.

Wm. Carr, *chairman.*

J. D. Patterson, *secretary.*

Chas. L. Alexander.

NATIONAL DENTAL ASSOCIATION.

Birmingham, Ala., March 30 to April 1.

THE thirteenth annual meeting of the National Dental Association will be held in Birmingham, Ala., March 30 and 31 and April 1 and 2, 1909. All meetings of the association, sections, and clinics will be held in the City Hall, at the corner of Fourth ave. and 19th st. The headquarters of the association will be at Hotel Hillman, directly opposite the City Hall. Reservations should be made through the chairman of the Local Committee of Arrangements, Dr. J. A. Hall.

All preparations for the meeting are well advanced, and a large attendance is assured.

V. E. TURNER, *President*,
Raleigh, N. C.
CHAS. S. BUTLER, *Sec'y*,
Buffalo, N. Y.

Organization of Sections.

SECTION I.

Prosthetic Dentistry, Crown and Bridge Work, Orthodontia, Metallurgy, Chemistry, and Allied Subjects.

HARRY E. KELSEY, *Chairman*, Commonwealth Bank Bldg., Baltimore, Md.

H. H. JOHNSON, *Vice-chairman*, 306 Second st., Macon, Ga.

J. S. SPURGEON, *Secretary*, Hillsboro, N. C.

SECTION II.

Operative Dentistry, Nomenclature, Literature, Dental Education, and Allied Subjects.

W. G. EBERSOLE, *Chairman*, 800 Schofield Bldg., Cleveland, Ohio.

R. H. WALKER, *Vice-chairman*, 231 Main st., Norfolk, Va.

L. L. BARBER, *Secretary*, 311 Summit ave., Toledo, Ohio.

SECTION III.

Oral Surgery, Anatomy, Physiology, Histology, Pathology, Etiology, Hygiene, Prophylaxis, Materia Medica, and Allied Subjects.

C. C. ALLEN, *Chairman*, Rialto Bldg., Kansas City, Mo.

J. E. CHACE, *Vice-chairman*, Ocala, Fla.

J. W. HULL, *Secretary*, Altman Bldg., Kansas City, Mo.

PROGRAM.

The following incomplete program is announced:

General Session.

The following essays will be presented:

James McManus, D.D.S., Hartford, Conn.: (Subject to be announced.)

Edward C. Kirk, D.D.S., ScD., Philadelphia, Pa.: "The Dental Relationship of Arthritis."

L. G. Noel, D.D.S., Nashville, Tenn.: "The Management of the Mouths of Young People from the Age of Six to Adolescence."

Section I.

Martin Dewey, Kansas City, Mo.: "Development of the Face."

Discussion by Richard Summa, F. B. Noyes, Calvin S. Case, W. O. Talbot, C. A. Hawley, and F. C. Wilson.

H. H. Johnson, Macon, Ga.: "Crown and Bridge Work."

Discussion by H. T. Stewart, T. P. Hinman, C. L. Alexander, Gordon White, and Carroll H. Frink.

Clarence J. Grieves, Baltimore, Md.: "The Behavior of Certain Metals in the Mouth."

Discussion by Joseph Head, B. Holly Smith, J. E. Chace, and H. R. Jewett.

George H. Wilson, Cleveland, Ohio.: "The Principles of Retention of Artificial Dentures."

Discussion by S. L. Rich, Wm. B. Finney, F. W. Stiff, A. J. Cottrell, and N. C. Leonard.

Section II.

S. D. Ruggles, Portsmouth, Ohio: "Phases of Importance in Nomenclature."

Discussion by George H. Wilson.

George S. Vann, Gadsden, Ala.: "Dental Science a Part of Universal Literature."

Discussion by F. L. Hunt, Asheville, N. C.

W. T. Jackman, Cleveland, Ohio: "The Elimination of Fear in the Practice of Dentistry."

Herbert L. Wheeler, New York city: (Subject to be announced.)

J. R. Callahan, Cincinnati, Ohio: "Operative Dentistry—Root-Canal Treatment."

Section III.

A. H. Thompson, Topeka, Kans.: "The Evolution of Tools."

Discussion by L. C. Noel and G. V. I. Brown.

Levi C. Taylor, Hartford, Conn.: "Dentistry Past and Present as Seen by a Modern Hygienist."

Discussion by N. S. Hoff, A. C. Fones, and J. Y. Crawford.

Gordon White, Nashville, Tenn.: "Something on Pyorrhea."

Discussion by J. D. Patterson, J. C. Hartzell, and J. D. Towner.

A. W. Harlan, New York city: "Friction as an Aid to Restoration of Gum Tissue."

Discussion by H. H. Johnson, H. W. Gillette, and J. H. Crossland.

Truman W. Brophy, Chicago, Ill.: "Recent Progress in Oral Surgery."

Discussion by J. D. Patterson and T. P. Hinman.

Railway Rates.

THE Southeastern Passenger Association grants excursion rates as follows: From Washington, D. C., and return, \$27.15; from Cincinnati, Ohio, and return, \$17.55; from Cairo, Ill., and return, \$12.50; from Evansville, Ind., and return, \$13.60, and proportionate rates from all agency stations in territory south of the Ohio and Potomac and east of the Mississippi rivers. Tickets for going can be purchased March 29th and 30th, good for return not later than April 4th—all tickets limited to continuous passage. Persons outside the territory above indicated should purchase ticket to the nearest point where reduced rate can be obtained. This reduced rate is not on the certificate plan.

Hotel Rates.

Hotel Hillman: \$1.50 and \$2.00 per day without bath; \$2.50 and \$3.00 per day with bath; two persons occupying the same room, with bath, \$2.50 per day for each person.

Florence Hotel: \$1.50 and \$2.00 per day, without bath; \$2.50 and \$3.00 per day, with bath; two persons occupying the same room, with bath, \$2.50 per day for each person.

Hotel Morris: \$1.50 and \$2.00 per day, single, without bath; \$2.50 and \$3.00 per day, single, with bath; \$1.25 and \$1.50 each, double, without bath; \$1.75 and \$2.00, each, double, with bath; European plan.

Birmingham Hotel: \$1.00 to \$2.00 per day, one to a room; \$2.00 to \$3.00 per day, with bath.

Metropolitan Hotel: \$1.00 to \$2.00, without bath; \$1.50 to \$2.00, with bath.

Jefferson Hotel: \$2.50 and \$3.50 per day, one to a room with bath; \$6.00 per day, two to a room, with bath. American plan.

Colonial Hotel: \$1.00 to \$2.00, without bath; \$1.50 to \$2.00, with bath.

Change in Membership Regulations.

At the 1908 meeting of the National Dental Association adopted an amendment making all members in good standing in their state dental societies, or their allied societies, eligible to membership in this association, by presenting to the proper authorities at the regular meeting a certificate signed by the president and secretary of any such society.

Those desiring to take advantage of their privileges under said amendment should act promptly, as the National Association meets early next year, the last Tuesday of March, 1909, at Birmingham, Ala.

Blanks can be secured from the secretaries of the various state dental societies or the undersigned.

H. C. BROWN, *Corresponding Sec'y*,
185 E. State st., Columbus, O.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

THE twenty-seventh annual meeting of the National Association of Dental Examiners will be held at the Hotel Chamberlain, Old Point Comfort, Va., the first session opening at 10 o'clock A.M., Monday, August 2, 1909, and continuing during the 3d and 4th.

The result of the mail vote by the committee to ascertain the consensus of opinion as to place and date, from October 19th to the present date was ninety-one votes for Old Point Comfort the first three days of August, thirteen for Birmingham in March, seven for Birmingham in July; the president has therefore selected Old Point Comfort.

The rates will be: American plan \$3.00 per day without bath and \$4.00 per day with bath. Large and commodious meeting-rooms will be furnished free. Railroad and steamship rates will be furnished at a later date.

CHAS. A. MEEKER, *Sec'y*.

NATIONAL ASSOCIATION OF DENTAL FACULTIES.

THE National Association of Dental Faculties will hold their annual meeting in connection with the National Association of Dental Examiners in the Hotel Chamberlain, Old Point Comfort, Va., August 2, 3, and 4, 1909, commencing at 10 A.M.

Rates will be the same as the National Association of Dental Examiners. Railroad and steamship rates will be given at a later date.

B. HOLLY SMITH, *Chairman Ex. Com.*

AMERICAN DENTAL SOCIETY OF EUROPE.

THE thirty-sixth annual meeting of the American Dental Society of Europe will be held in Wiesbaden, Germany, on April 9, 10, and 12, 1909. An interesting program is already assured. A most cordial invitation is extended to members of the profession to be present.

T. G. PATTERSON, *Hon. Sec'y*,
2 Quai des Eaux Vives, Geneva, Switzerland.

WASHINGTON UNIVERSITY, DENTAL DEPARTMENT.

ANNUAL ALUMNI CLINIC.

THE annual alumni clinic of Washington University, Dental Department, will be held at the college building, 27th and Locust sts., on March 29 and 30, 1909. We hope to make this one of the largest alumni meetings ever held, and also that the attendance will be in proportion. Any sacrifice that you will be compelled to make to attend this meeting will be repaid by the benefit you receive therefrom.

J. H. KENNERLY.

ST. LOUIS DENTAL COLLEGE ALUMNI ASSOCIATION.

THE Alumni Association of the St. Louis Dental College (formerly Marion-Sims) will hold their annual clinic at the college building, Grand ave. and Caroline st., on May 20 and 21, 1909.

An excellent program is being prepared. Special attention is being given to the clinical program. The annual banquet will be on Thursday night, and the election of officers for the ensuing year will take place after the clinics the following day.

All ethical members of the profession are cordially invited to be present. Program and exact date to be published in later issues of this journal.

S. T. McMILLIN, *President.*

JOHN B. O'BRIEN, *Ch'm Publicity Committee*,
5761A Etzel ave., St. Louis, Mo.

DELTA SIGMA DELTA FRATER- NITY

AT SEATTLE EXPOSITION.

THE Seattle Auxiliary wishes to announce the annual Supreme Chapter meeting of Delta Sigma Delta Fraternity in Seattle, on July 21, 22, and 23, 1909. July 24th will be "Delta Sigma Delta day" at the Alaska-Yukon-Pacific Exposition.

C. F. FISET, *Historian.*

FOX RIVER VALLEY (WIS.) DENTAL SOCIETY.

THE Fox River Valley Dental Society will hold its midwinter clinic at Fond du Lac, Wis., on Tuesday, March 9, 1909. All ethical practitioners are invited. Address inquiries to

GEO. A. STRATTON, *Sec'y*,
Oshkosh, Wis.

ARMY DENTAL CORPS.

CHANGES of stations of dental surgeons, U. S. Army, for week ending February 13, 1909:

George H. Casaday, relieved from duty at the Army General Hospital, San Francisco, Cal., and ordered to Fort Shafter, H. T., for duty.

Edward P. R. Ryan, ordered from Muscogee, Okla., to Fort Leavenworth, Kansas, for duty.

George E. Stallman, left Fort Sam Houston, Texas, for duty at Fort McIntosh, Texas.

Hugh G. Voorhies, ordered to a month's duty at each of these posts: Fort Lincoln, N. D.; Fort Yellowstone, Wyo.; Fort William Henry Harrison, Mont.; Fort Missoula, Mont., and Fort Assiniboine, Mont.

S. Davis Boak, granted leave of absence for one month, upon arrival in the United States from Cuba.

F. Homer Wolven will proceed to the Post of Jolo, Jolo, for duty.

PSI OMEGA DENTAL FRATERNITY.

THE annual banquet of the Psi Omega Dental Fraternity in New York city will be held on Friday evening, March 19, 1909, at the Hotel Manhattan, 42d st. and Madison ave. Any brothers from out of town who may be visiting the city at that time are cordially invited to be present. For information and particulars, address the secretary of the banquet committee,

J. L. PETERS,
1517 Hone ave., Westchester, N. Y.

STATE UNIVERSITY OF IOWA, DENTAL DEPARTMENT.

THE sixth annual meeting of the Alumni Association of the College of Dentistry of the State University of Iowa will be held March 9 and 10, 1909, in the dental college building at Iowa City, Iowa. A profitable meeting is assured, with good clinics and papers. All ethical practitioners are requested to reserve the dates and plan to be present.

LEON L. BRANSON, *Sec'y*,
Iowa City, Iowa.

COMPLIMENTARY BANQUET TO DR. C. R. BUTLER.

THE dental profession of Cleveland, Ohio, will give a complimentary dinner to one of its most honored members, Dr. C. R. Butler, on March 11, 1909, at the Hollenden Hotel, at 7 P.M., in commemoration of the completion of fifty-one years of dental practice by the doctor. This will be a democratic affair, to which all ethical dentists are invited. The price per plate will be within the reach of all. Those desiring a place at the banquet will kindly notify the secretary at least ten days before.

S. B. DEWEY, *Sec'y*,
Lennox Bldg., Cleveland, Ohio.

LOUISIANA STATE DENTAL SOCIETY.

THE thirty-first annual meeting of the Louisiana State Dental Society will be held at the St. Charles Hotel, in New Orleans, La., on Wednesday, Thursday, and Friday.

April 28, 29, and 30, 1909. An interesting program is already assured. A most cordial invitation is extended to all ethical members of the profession to be present and participate in the meeting.

DR. H. J. FELTUS, *President*,
Baton Rouge, La.

DR. J. P. WAHL, *Chairman Ex. Com.*,
3634 Magazine st., New Orleans, La.

DR. A. L. PLOUGH, *Cor. Sec'y*,
New Orleans, La.

EASTERN KENTUCKY DENTAL ASSOCIATION.

THE recently organized Eastern Kentucky Dental Association will meet Saturday, April 3, 1909, at Ashland, Ky., and every third month thereafter at such place as the vote may direct.

The following officers were elected: R. H. Leete, Prestonburg, President; J. A. Tauber, Catlettsburg, vice-president, and P. H. Williams, Ashland, secretary.

P. H. WILLIAMS, *Sec'y*.

LAKE ERIE (PA.) DENTAL ASSOCIATION.

THE forty-sixth annual meeting of the Lake Erie Dental Association will be held at Hotel Rider, Cambridge Springs, Pa., on May 18, 19, and 20, 1909. All reputable dentists are cordially invited to share in this meeting.

V. H. McALPIN, *Sec'y*.

TENNESSEE STATE DENTAL ASSOCIATION.

THE forty-fourth annual meeting of the Tennessee State Dental Association will be held in Memphis, Tenn., May 25, 26, and 27, 1909. This meeting promises to be one of the most interesting gatherings of any within the history of the association. Ample space will be provided for exhibitors and clinicians. A cordial invitation is extended to all reputable members of the profession to attend and take part in the proceedings.

DELAN KINNEY, *Cor. Sec'y*,
Nashville, Tenn.

MISSISSIPPI DENTAL ASSOCIATION.

THE sixteenth annual meeting of the Mississippi Dental Association will be held in Natchez, May 11, 12, and 13, 1909.

L. B. PRICE, *Sec'y*,
Corinth, Miss.

ILLINOIS STATE DENTAL SOCIETY.

THE forty-fifth annual meeting of the Illinois State Dental Society will be held at Danville, May 11, 12, 13, and 14, 1909.

R. J. HOOD, *Sec'y*,
Sparta, Illinois.

MASSACHUSETTS DENTAL SOCIETY.

THE forty-fifth annual meeting of the Massachusetts State Dental Society will be held at Boston, Mass., on June 9, 10, and 11, 1909.

W. E. BOARDMAN,
Boston, Mass.

SOUTHERN CALIFORNIA DENTAL ASSOCIATION.

THE twelfth annual convention of the Southern California Dental Association will convene June 28, 29, and 30, 1909, at the College of Dentistry, University of Southern California, Fifth and Wall sts., Los Angeles, Cal.

CHAS. E. RICE, *Sec'y*,

KENTUCKY STATE DENTAL ASSOCIATION.

THE thirty-ninth annual convention of the Kentucky State Dental Association will convene at Crab Orchard Springs, Ky., May 17, 18, and 19, 1909. We anticipate a most interesting and profitable meeting at this most popular central Kentucky resort. A cordial invitation is extended to all ethical members of the profession.

W. M. RANDALL, *Sec'y*.

NORTH CAROLINA DENTAL SOCIETY.

THE thirty-fifth annual meeting of the North Carolina Dental Society will be held at Asheville, N. C., June 23 to 26, 1909. The Battery Park Hotel will be the headquarters. All ethical practitioners are cordially invited to attend.

J. C. WATKINS, *Sec'y*,
Winston-Salem, N. C.

VIRGINIA STATE DENTAL ASSOCIATION.

THE fortieth annual session of the Virginia State Dental Association will be held at The Mecklenburg, Chase City, Va., July 21, 22, and 23, 1909. Every effort is being made to make this the most interesting and successful meeting of our society. Men of national reputation will give clinics and read papers. All ethical practitioners are cordially invited to attend.

W. H. PEARSON, *Cor. Sec'y*,
Hampton, Va.

TEXAS STATE DENTAL ASSOCIATION.

THE annual meeting of the Texas State Dental Association will be held at Waco, June 10, 11, and 12, 1909.

We call the attention of manufacturers, exhibitors, and visitors to the circuit formed by the three meetings—Missouri (May 26-28), Oklahoma (June 3-5), and Texas as above. By this arrangement it is expected to secure a larger number of prominent men and valuable exhibits than heretofore.

The profession is cordially invited to attend.

J. G. FIFE, *Sec'y*,
Dallas, Tex.

MINNESOTA BOARD OF EXAMINERS.

THE next regular meeting of the Minnesota Board of Examiners for the examination of applicants for license to practice dentistry in Minnesota will be held at the dental depart-

ment of the State University in Minneapolis, beginning on March 9, 1909, at 9 A.M.

All applications must be in the hands of the secretary by March 1, 1909. For further information address

GEO. S. TODD, *Sec'y*,
Lake City, Minn.

TENNESSEE BOARD OF EXAMINERS.

THE next regular annual meeting of the Tennessee State Board of Dental Examiners will be held at Nashville, Tenn., May 18 to 21, 1909. Examinations will be held in all branches taught in dental colleges. All applications for examinations must present diplomas from reputable dental colleges, and applications for examinations should be made to the secretary ten days prior to the meeting. Examination fee, \$10.00.

F. A. SHOTWELL, *Sec'y-Treasurer*,
Rogersville, Tenn.

TEXAS BOARD OF EXAMINERS.

THE regular meeting of the Texas State Board of Dental Examiners will be held in Waco, Texas, beginning at 9 A.M., Monday, June 14, 1909.

Diplomas not recognized or registered; examinations are required of all. No interchange of license with any other state. No special examination to practitioners already in practice. Applications, accompanied by a fee of \$25, should be in the secretary's hands by June 10th. For further information address

BUSH JONES, *Sec'y*,
Dallas, Texas.

MASSACHUSETTS BOARD OF REGISTRATION.

A MEETING of the Massachusetts Board of Registration in Dentistry for the examination of candidates will be held in Boston, Mass., March 3, 4, and 5, 1909.

Candidates who have applied for examination will report to the secretary, Wednesday, March 3, at 10 o'clock A.M., at Harvard College Dental Infirmary, North Grove st., prepared with rubber dam, gold, plastic filling materials and instruments, to demonstrate their skill in operative dentistry. Anyone who

wishes may bring his patient. So far as possible patients will be furnished. The board in every instance selects the cavity to be filled. Partially prepared cavities never accepted.

The theoretic examination—written—will include operative dentistry, prosthetic dentistry, crown and bridge work, orthodontia, anatomy, histology, surgery, pathology, materia medica, therapeutics, physiology, bacteriology, anesthesia, chemistry and metallurgy, and will be held at the Civil Service Rooms, State-house, from Thursday, March 4, at 10 A.M., until Friday P.M., March 5.

All applications, together with the fee of twenty dollars, if first examination, must be filed with the secretary of the board on or before February 24, 1909, as no application for this meeting will be received after that date.

Candidates for second and subsequent examinations will be required to fill out an application blank (Form 2) and forward to the secretary as above.

Every candidate for examination must be twenty-one years of age. Application blanks may be obtained from the secretary. Temporary licenses are never granted. The fee for third and subsequent examinations is \$5.00.

G. E. MITCHELL, *Sec'y*.

NEW JERSEY BOARD OF REGISTRATION.

THE New Jersey State Board of Registration and Examination in Dentistry will hold their semi-annual examination in the Assembly chamber of the State-house, Trenton, N. J., beginning Tuesday, July 6, 1909, and continuing through the 7th and 8th.

Practical examinations will be held on the 6th, theoretical examinations on the 7th and 8th. Practical work consists of soldering a gold or silver plate, one gold filling, and one amalgam filling. The gold filling must be an approximal one, with an approximating tooth in position.

Candidates are requested to bring their patients. Photograph and preliminary credentials must accompany the application. Sessions begin promptly at 8 A.M., each day.

Applications must be in hands of the secretary ten days prior to the examination.

CHARLES A. MEEKER, D.D.S., *Sec'y*,
29 Fulton st., Newark, N. J.

ILLINOIS BOARD OF EXAMINERS.

THE next regular meeting of the Illinois State Board of Dental Examiners for the examination of applicants for a license to practice dentistry in the state of Illinois will be held in Chicago at the Chicago College of Dental Surgery, S. E. corner Wood and Harrison sts., beginning Thursday, June 10, 1909, at 9 A.M.

Applicants must be in possession of the following requirements in order to be eligible to take the examination: (1) Any person who has been engaged in the actual, legal, and lawful practice of dentistry or dental surgery in some other state or country for five consecutive years just prior to application; or (2) is a graduate and has a diploma from an accredited high school, or a certificate signed by a state superintendent of public instruction or his duly authorized deputy or equivalent officer, acting within his proper or legal jurisdiction, showing that the applicant has a preliminary education equal to that obtained in an accredited high school, and is a graduate and has a diploma from the faculty of a reputable dental or medical college, school, or dental or medical department of a reputable university, and possesses the necessary qualifications prescribed by the board.

Candidates will be furnished with proper blanks and such other information as is necessary on application to the secretary. All applications must be filed with the secretary five days prior to the date of examination. The examination fee is twenty dollars, with the additional fee of five dollars for a license.

Address all communications to

J. G. REID, *Sec'y*,
1204 Trude Bldg., Chicago, Ill.

UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING JANUARY 1909.

January 5.

- No. 908,626, to EDWIN TELLE. Dental plate and method of manufacturing same.
- No. 908,627, to EDWIN TELLE. Method of attaching teeth to dental plates.
- No. 908,643, to SAMUEL S. BLOOM. Artificial tooth.
- No. 909,038, to EDWIN TELLE. Dental plate.

January 12.

- No. 909,204, to HENRY NIELSON. Rotary brush.
- No. 909,223, to W. H. REYNOLDS. Dental stool.
- No. 909,283, to JOS. F. CLAPP. Alloy.
- No. 909,643, to C. C. MURRAY. Dental implement.

- No. 909,696, to S. SHIMURA and Y. MINAGAWA. Process for molding tooth-crowns.

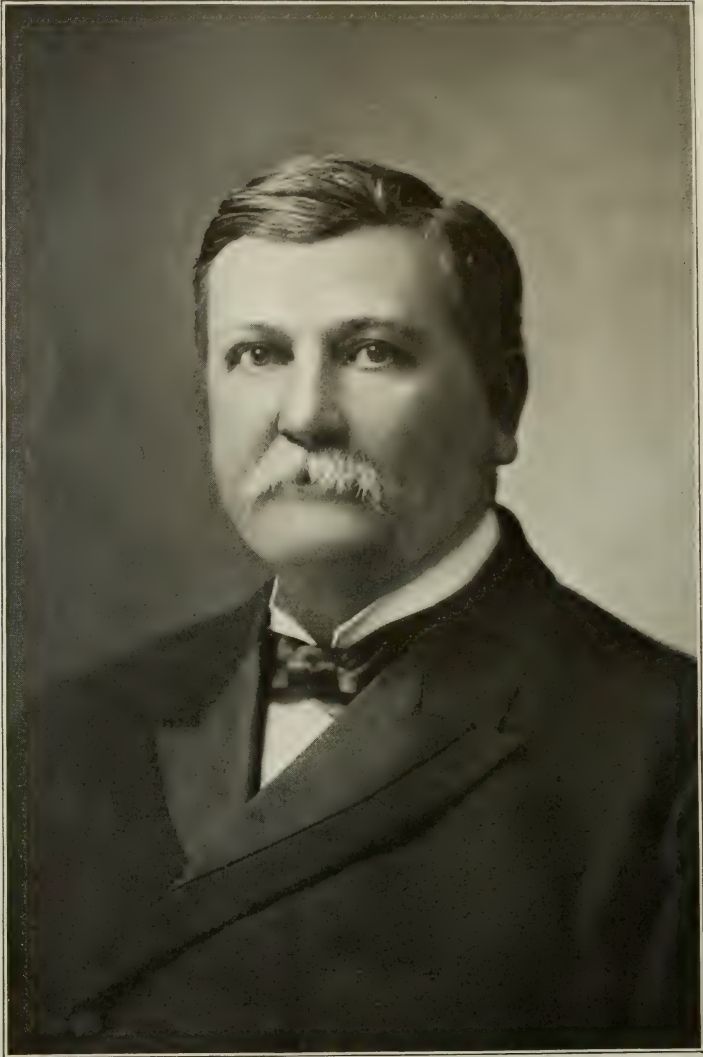
January 19.

- No. 909,913, to E. F. LANDIS. Polishing wheel.
- No. 910,014, to E. C. OLIVER. Flexible shaft.
- No. 910,357, to FRANK E. CASE. Dental chair.
- No. 910,479, to W. S. ANDREWS. Electric heater.

January 26.

- No. 910,631, to H. B. ZENDEL. Swaging device.
- No. 910,870, to G. SIBLEY. Artificial tooth.
- No. 910,970, to A. M. STRYKER. Tooth-brush.





DR. A. W. HARLAN.

THE DENTAL COSMOS.

VOL. LI.

APRIL 1909.

No. 4.

ORIGINAL COMMUNICATIONS.

EARLY TREATMENT OF MALOCCLUSION OF THE TEETH.

By J. LOWE YOUNG, D.D.S., New York, N. Y.

(Read before the First District Dental Society of the State of New York, October 13, 1908.)

THE fact that so many parents have been advised by the general practitioner to defer treatment of their children until after all the permanent teeth are in place has prompted the selection of this topic for discussion this evening.

In the past few years considerable attention has been given to oral prophylaxis. Prophylaxis means "Preservative or preventive treatment of disease." Oral prophylaxis means "preservative or preventive treatment of disease in the oral cavity," which in a broad sense embraces not only healthy mucous membrane and teeth free from caries, but also the normal eruption of the teeth resulting in normal occlusion; which means that all the teeth in one jaw are occluding with the teeth of the opposing jaw, so as to furnish the largest area of grinding surface. The cusps, the inclined planes and the sulci into which they fit should combine to furnish the owner with the best masticating apparatus, and should form dental arches which in re-

gard to strength and durability cannot otherwise be equaled. The cusps of all the grinding teeth in such arches, interlocking with their antagonists, prevent these teeth from any variation in position either bucco-lingually or mesio-distally, provided that an harmonious pressure be exerted by the tongue, cheeks, and lips. This regularity of the teeth in normal arches is also one of the chief factors in their resistance to decay, and to disease of the surrounding tissues, for the teeth, if they are properly formed, are in a position to be as nearly self-cleansing as possible. (Figs. 1, 2, and 3.)

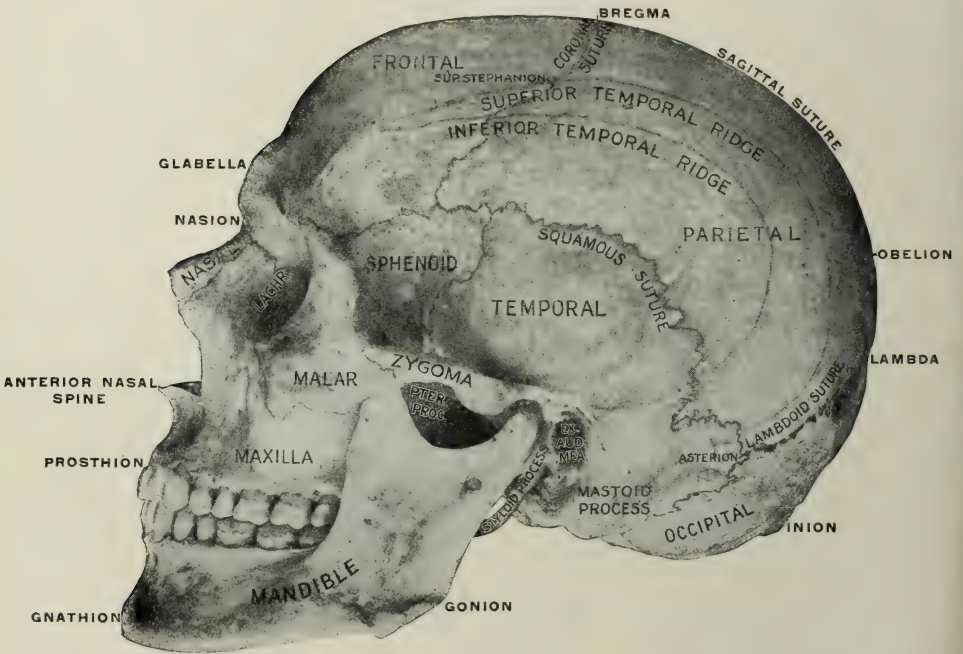
In order to fully appreciate normal occlusion, the arrangement of the lingual cusps should be carefully examined. This is only possible with either models or skulls, and in examining, careful attention must be paid to the mesio-lingual cusp of the upper first permanent molar. If the molars are in normal relation to each other this cusp will fit, and practically fill the mortar formed by the cusps

of the lower first permanent molar, acting like a pestle, as it were. (Fig. 4.) In should also be noted that a slight rotation of the upper first permanent molar,

FIG. 1.



FIG. 2.



this mortar all excessively hard substances are placed for grinding. It not readily noticeable from the buccal side, is sufficient to disarrange this won-

FIG. 3.



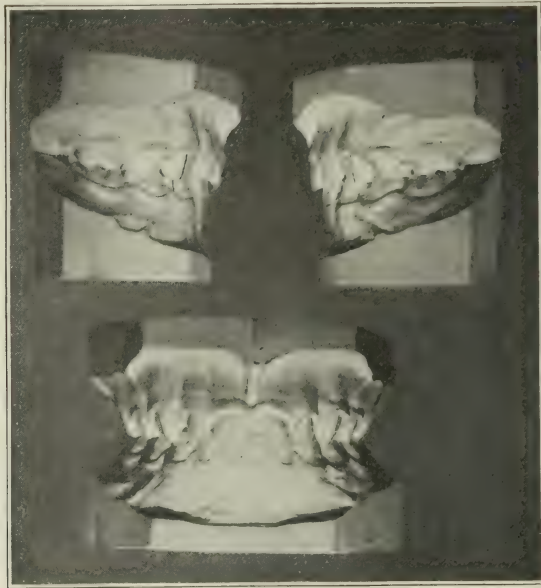
FIG. 4.



derful grinding apparatus to a marked degree. In the normal buccal arrangement the mesio-buccal cusp of the upper

of the upper teeth to those of the lower is never such as to enable the owner to properly masticate his food, although

FIG. 5.

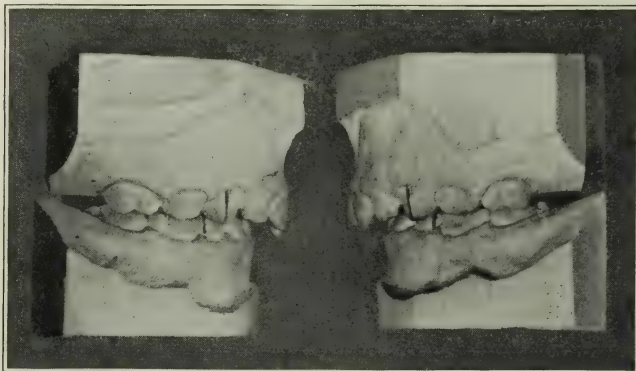


first permanent molar is occluding with the mesial and distal buccal cusps of the lower first permanent molar on the same side. Further note in this examination

very often the interdigitation of the buccal cusps may seem very good.

You may say I am an idealist. Granted. The man who has not an ideal

FIG. 6.



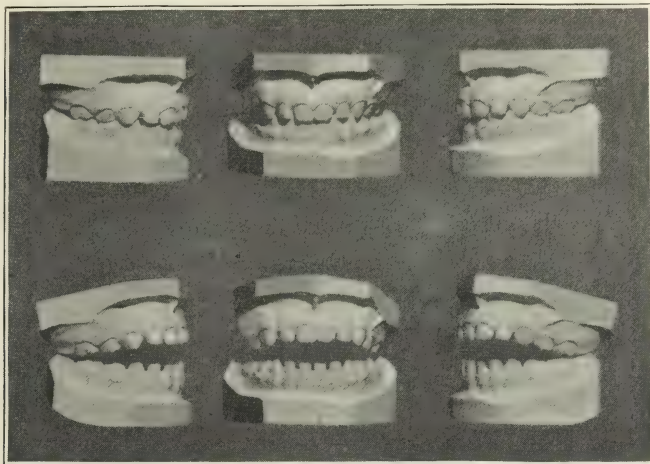
from the lingual side that when the lower teeth are all distal the width of one bicuspoid, or mesial the width of one bicuspoid, the relation of the lingual cusps

to work by is not advancing very fast; there is no such thing as standing still. We are either becoming better, which is only accomplished by trying to improve

on all our previous efforts, or else we are becoming worse, owing to our inborn laziness and egotism. We vindicate ourselves by saying, "I do just as well or a

with surfaces hard to cleanse, and marred facial lines. By dental arches we mean the teeth and their surrounding tissues, including the alveolar process.

FIG. 7.



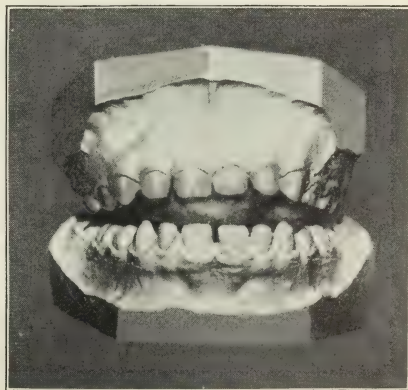
little better than other men do," or, "It is worth all the patients are paying." Man has never done anything too well in any class of work; then why should he stop striving for his ideal, when treating one of his fellow beings? Note that I say *his* ideal, for we do not all have the same ideal, and that is why I have shown slides of as nearly normal occlusion as I have been able to find.

Men have come to me for information about cases, saying that one arch was normal, or perhaps that both arches were normal, while in reality everything was abnormal, showing that their ideals in this matter were far different from mine.

The same may be said of those who advocate extraction in the correction of malocclusion. I challenge anyone to show good true models made from accurate plaster impressions of mutilated cases with the remaining teeth in real occlusion. Furthermore, wherever teeth are lost in early life, there is always a lack of development of the arches and the nasal passage, a tipping and rotating of the tooth distal to the space so caused,

It must not be understood from the above that teeth must never be extracted, for we occasionally find a fourth molar, and a fifth incisor, and sometimes a third

FIG. 8.

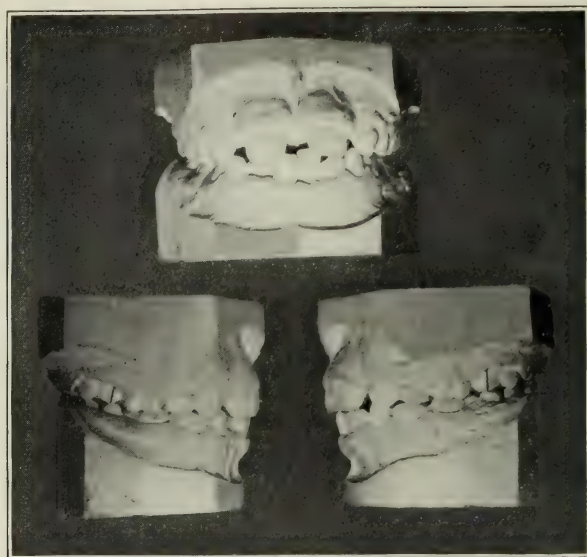


bicuspid, where as a matter of course extraction is permissible, and usually indicated. Also in the treatment of adults, cases will be met with in which judicious extraction may be advisable, because if

there has been a very pronounced lack of development of the dental arches and of the underlying bones, it is very doubt-

great number of skulls, discovered what the normal dental arch should be and also that a mathematical relation exists be-

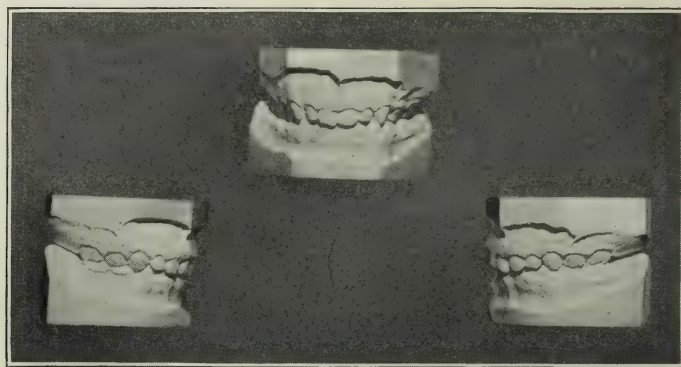
FIG. 9.



ful whether sufficient bone development will follow the proper placing of the crowns of such a set of teeth. But rarely

tween the combined width of the upper central, lateral, and canine, and the entire arch, and from their measurements

FIG. 10.



indeed is a case found where extraction is indicated if treatment is instituted at the proper age.

About the middle of the last century the late Dr. Bonwill, after examining a

he was able to construct the entire arch as it should be when normal. He made use of these ideas in the construction of artificial teeth. Articles containing these ideas, written by him at that time or

shortly after, were refused publication. Those interested will find in *Items of Interest* for September 1899, an essay by this great man that is well worthy of careful reading. The "American System of Dentistry" contains a copy of the essay which he wrote in 1885.

At the St. Louis congress Dr. C. A. Hawley read a paper (see *Cosmos*, 1905, page 541) in which he recognized these facts and adapted Dr. Bonwill's discovery

half as bad as that red stuff Dr. A. used," and the younger the patient the more likely he is to prefer plaster to modeling compound.

Is it possible, then, to practice oral prophylaxis in this broad sense, so as to bring about normal eruption, resulting in normal occlusion of the teeth? If so, when should we begin?

At three years of age, or earlier, a child should have the full set of decidu-

FIG. 11.



to the use of the orthodontist. Subsequently, by taking the average from a great many careful measurements, he has been able to form a plan by which, by measuring the width of one upper central incisor, the shape and size of the arch may be approximately determined.

The better the beginning, the more successful the ending will be; so in order that we may hope for success in the correction of a case of malocclusion, the first requirement is a set of accurate models, not merely one model, made from impressions taken with "that horrid plaster" that runs down the throat if it is not properly handled. Many times young patients have remarked after passing through this ordeal, "Why that is not

ous teeth standing in close contact with each other. These teeth are not always in proper alignment or in proper occlusion. Fig. 5 shows normal occlusion of the deciduous teeth at three and one-half years of age. Fig. 6 shows the deciduous teeth of a child at five, with the lowers distal to normal or developing into a case of class II, Dr. Angle's classification.

It should be the first thought of the general practitioner when a child patient comes to visit him, to examine the relation in which the lower teeth stand to the upper, and if this relationship be wrong mesio-distally in any marked degree, the sooner the irregularity is corrected the better. If left uncorrected,

the first permanent molars, which erupt immediately distally and in contact with the second deciduous molars, cannot occlude properly, and when left in abnormal occlusion mesio-distally they produce an improper locking of all the other buccal teeth. Lack of proper restoration of approximal contour, or the premature loss of one or more deciduous molars, which allows the erupting first permanent molar to drift forward, will also prevent the normal locking of these important

as the combined widths of the four incisors. Spaces should also exist between the canines and the first deciduous molars, as the permanent canine is wider than the deciduous canine. But how seldom do we find this normal development, and why?

"The jaws are endo-membranous in their origin, but very early in their development a periosteum is formed over the surface of the bone already formed, and from that time on the growth of the

FIG. 12.

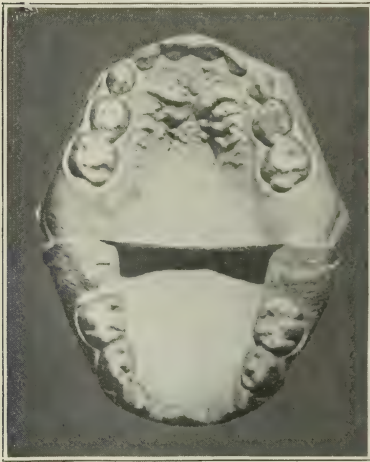


FIG. 13.



teeth. It is not advisable or beneficial to rotate malturned incisors of the deciduous set.

If a close observation be made every six months, and normal development is taking place, slight spaces appear between the upper and lower centrals and laterals, sometimes at the early age of three and one-half years. (Fig. 7.) This spacing should continue, and by the sixth year there should be enough room between the mesial surfaces of the laterals to accommodate the permanent centrals, which we all know are considerably wider than the deciduous centrals. (Fig. 8.) There should also be spaces between the laterals and canines, and by the time the permanent laterals begin to erupt, the curve in the arch line between the mesial surfaces of the canines should be as great

bone as an organ is through the functions of the periosteum, together with the articular cartilages and the peridental membranes. By these tissues the bone is built up, but by the periosteum the surface is sculptured and molded into form, and by the osteogenetic tissues inclosed within the surfaces of the bone the internal structure is constantly being rebuilt, so as to adapt the organ to the forces to which it is subjected with the least possible weight. The more carefully this is studied the more evident it becomes that bone is formed and removed in response to mechanical stimuli, and that the entire surface is arranged in harmony with the mechanical stresses which result from the forces applied to the teeth and the surface of the bone."

This is a quotation from a paper by

Dr. F. B. Noyes, published in the *American Orthodontist*, vol. i, No. 3.

little to extract the food. The average time for a feeding should be twenty min-

FIG. 14.



FIG. 15.



The above statement being granted, what can be more logical than that the lack of use owing to improper foods should become a great factor in the non-

utes, which is about the time a child requires for nursing if normally fed.

You may ask, If we are to live on foods that do not require mastication, what is

FIG. 16.



FIG. 17.



development of the dental arches and muscles of mastication. This lack of use may begin at birth, in bottle-fed babies, as the rubber nipples are so constructed that the infant has to exert himself but

the need of paying such strict attention to the development of the dental arches? The answer is that under-developed dental arches are almost always associated with under-developed nasal passages.

When this latter malformation prevails to a marked degree the child is compelled to open the mouth in order to get sufficient air, but the mouth was not intended as an air-passage, and the air taken into the lungs by way of the mouth is neither properly warmed nor properly filtered, and bronchial infections are far more liable to occur in mouth-breathers. Also disharmony in the facial lines is always associated with a lack of development of the arches.

About the sixth year the first permanent molars erupt, and if you observe

ward, so as to eventually lie in contact with the distal surfaces of the second bicuspid, thus allowing the molars to occlude properly. In this forward movement, while the upper second bicuspids are erupting, the upper molars have only advanced six one-hundredths of an inch, while the lower molars have advanced ten one-hundredths of an inch. This is due, we believe, to the wedging influence of the third molars, which are then developing between the second permanent molars and the rami. How often one has observed the wedging influence of the

FIG. 18.

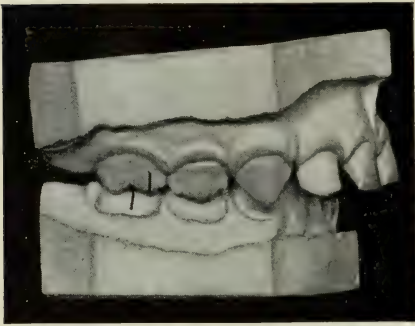
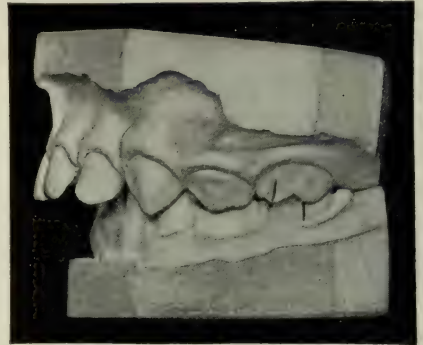


FIG. 19.



them very closely, you find that if the mesio-distal relations of the lower and upper deciduous teeth are absolutely correct, and there has been no loss of their mesio-distal diameters owing to decay or other causes, these permanent molars will not exactly fit, but on the contrary the lower ones are slightly distal, yet not beyond the influence of the inclined planes. (Fig. 9.) This distal position of the lower first permanent molar is caused by the very wise provision of nature whereby the lower second deciduous molar is formed considerably larger mesio-distally than its upper antagonist, which according to Black's "Dental Anatomy" averages ten one-hundredths of an inch more than the second bicuspid which replaces it. The upper second deciduous molar only averages six one-hundredths of an inch more than its successor.

When the second deciduous molars are lost, the first permanent molars drift for-

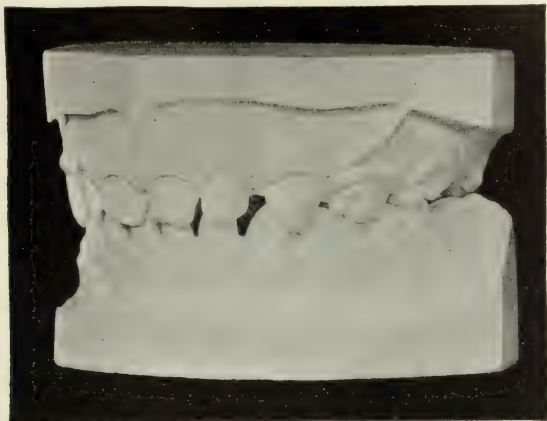
ward, so as to eventually lie in contact with the distal surfaces of the second bicuspid, thus allowing the molars to occlude properly. In this forward movement, while the upper second bicuspids are erupting, the upper molars have only advanced six one-hundredths of an inch, while the lower molars have advanced ten one-hundredths of an inch. This is due, we believe, to the wedging influence of the third molars, which are then developing between the second permanent molars and the rami. How often one has observed the wedging influence of the

lower third molars, and their baneful effects in non-developed arches, as late as the twentieth year. Just here it is in order to predict that if cases are corrected and properly developed at an early age, far less trouble will occur with the eruption of the third molars. If by the fifth or sixth year no approximal spacing in the incisor region is present, is it at all reasonable to expect that sufficient bone development will take place during the few months during which the permanent centrals are erupting? In other words, if there has been a cessation of development for two or three years, can nature catch up in as many months without orthodontic interference? There seems no valid reason why such cases, even with correct mesio-distal relation, should not be treated, and if this treatment is executed properly and carefully, the physical strain is much smaller than at any other age, and

the ultimate results are much more beneficial, not only to the dental arches, but to the upper respiratory tract and to the bones lying above the maxillæ, thus in-

11 shows profile models after one year's treatment. Fig. 12 represents the occlusal view of models before treatment. Fig. 13 represents the occlusal view of models

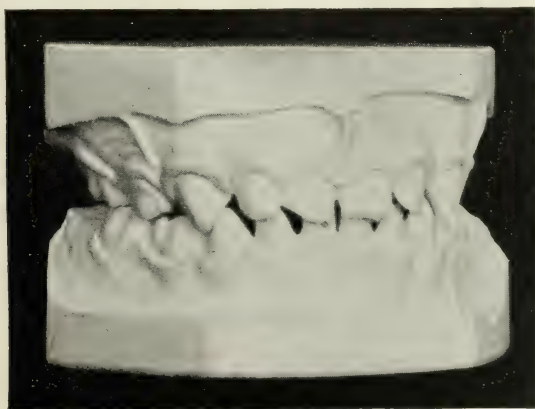
FIG. 20.



sureing greater regularity in size and position of the antra and of all the other sinuses of the face. Fig. 10 shows profile models of a child, six and one-half years old, without any permanent teeth. Some

after treatment. Figs. 14 and 15 show profile and front view of the face before treatment was begun. Figs. 16 and 17 show the same face a year later. You are to judge whether the pronounced expan-

FIG. 21.



difficulty was experienced in convincing her parents, especially the mother, of the advisability of beginning treatment at this tender age, and it is doubtful if she would have consented had not an older daughter been treated successfully. Fig.

sion of the dental arches has distorted the facial lines.

A very interesting point in this case was the forward movement of the upper and lower central incisors without a particle of force being exerted on them.

FIG. 22.



FIG. 23.

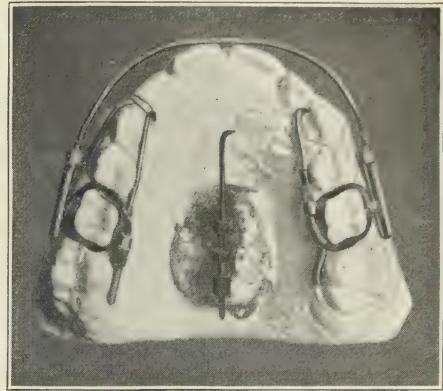


When they peeped through the gums they were entirely lingual to the deciduous centrals.

At this age the crypts of the upper bicuspid will be embraced by the three roots of the deciduous molars, and those of the lower bicuspid will be embraced by the two roots of the deciduous molars, and will themselves have no roots. When these deciduous teeth are moved into the position which they ought to occupy, they carry with them the crypts of the permanent teeth, where they remain if the deciduous teeth are retained in their new position. As development subsequently takes place, the deciduous teeth are lost, the roots develop on the bicuspid, and they will usually erupt in the positions they should occupy, and eventually become fixed there, and no injury can be done to the permanent teeth by the appliances used in such an operation. Who would question that teeth which erupt in the manner described

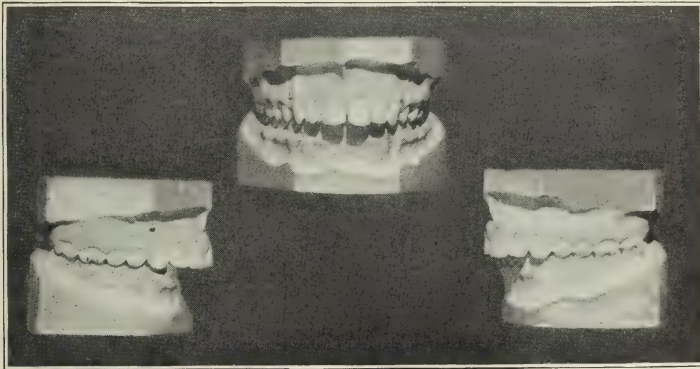
pids. All such cases of either class II or class III—Dr. Angle's classification—

FIG. 24.



should be treated at once, as the advantage gained far outweighs the extra attention which the subsequent eruption

FIG. 25.



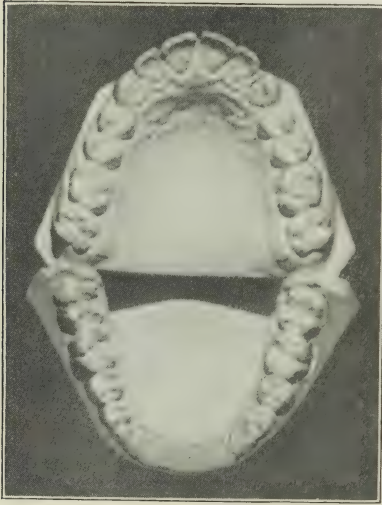
above are surrounded by bone that is far more capable of withstanding disease, and having greater recuperative power, than where resorption has been caused by pressure necessary to move fully erupted teeth into position?

The question often arises as to the advisability of beginning the treatment of children in the tenth or eleventh year, or at the period when the deciduous molars are soon to be replaced by the bicus-

pid of the bicuspid and canines will require. Figs. 18 to 23, inclusive, illustrate the treatment of a child of four years of age by Dr. G. P. Mendell. (See DENTAL COSMOS for August 1907, page 820.) Often in class I the same procedure is advisable, but in all such cases it is well to avoid as much as possible the use of the ligatures on deciduous teeth. This can be accomplished by soldering a wire on the screw of the clamp bands—as suggested

by Dr. C. A. Hawley—in such a way that it will lie in contact with the lingual sur-

FIG. 26.



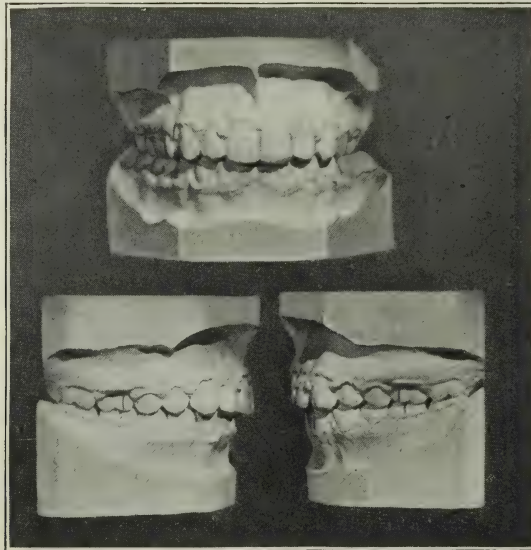
faces of the deciduous teeth. (Fig. 24.) The front end should be turned up so

A very small spur should also be soldered at the bend, so that a ligature can be passed from it to the arch between the canine and the lateral.

While it may not be possible to manage by this early treatment all cases in such a way that all the permanent teeth will take their proper positions, yet if a case is kept under supervision as it should be, each malposed tooth, as it erupts, can be easily guided into its proper place, where it will only require retention until its normally developed socket is fully formed by the upward growth of bone. How much easier and better it is to do this than to wait till the twelfth or fifteenth year in order to move all the permanent teeth into their proper position, with the great uncertainty as to their remaining in this new position even after a long period of retention.

I therefore wish to appeal to you as general practitioners to pay particular attention to the occlusion of the teeth of children, for it is to you that they will be taken first, and whenever you can

FIG. 27.



as to pass under the gums and be so shaped that it will hook on to the enamel ridge of the deciduous canine.

spare the time take good impressions of both arches, and make models from these, to be kept for comparison when

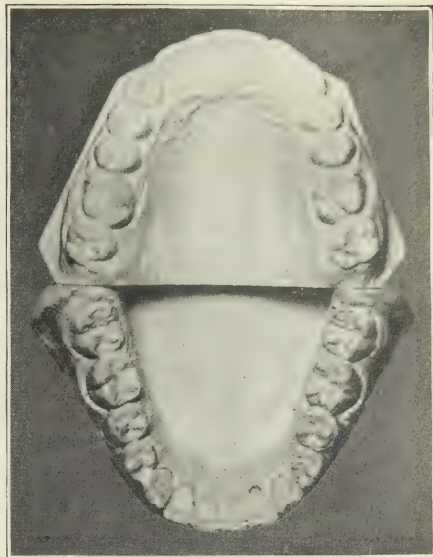
your little patient comes to see you six months or a year later. You are then fairly sure to take another set of impressions from time to time, and only in this way can you arrive at a definite knowledge of what really takes place in these cases. Unless these impressions be made carefully, they are of very little scientific value. These young children are not as often referred to the specialist as they should be, and as I hope they will be in the near future. I do not refer to those practitioners who are sending their cases to specialists, either because they have not the time to give to this work or because they feel that for the best interest of the patient they should not undertake the treatment themselves. It is very generally believed that treatment should be deferred till the eruption of all the permanent teeth except the third molars, but what would you think of the physician who would advise waiting till puberty before referring a case of club-foot to the surgeon?

It is customary to speak of irregular or crooked teeth in contradistinction to teeth in normal occlusion, but teeth which are apparently straight very often do not occlude properly. Figs. 25 and 26 will illustrate one of these cases, though they do not show it as clearly as the models would, owing to the difficulties encountered in securing photographs of

the lingual cusps. Figs. 27 and 28 show the same case after treatment.

It may not be out of place to show illustrations of models of cases before

FIG. 28.



and after treatment, and to give a few hints as to the application of fixed appliances such as were used in the treatment of these cases. [A number of illustrations of cases treated were shown.]

PLODDINGS TOWARD DIAGNOSIS BY SALIVARY ANALYSIS.

By A. W. DOUBLEDAY, D.M.D., Boston, Mass.

(Read before the New York Odontological Society, at its regular monthly meeting, October 20, 1908.)

MY attention was attracted some time ago by an advertisement in the *Philistine*, the truth of which appeals to me more and more as I work on the subject of saliva. The advertisement was headed "Don't Feed Your Face," and stated that over ninety per cent. of the ills from which civilized people suffer are due to the fact that man has adopted literally the slang phrase "feed your face." His selections and combinations of food are governed by their appeal to his eyes, nose, and mouth, no thought or consideration being given to the fact that the real purpose of eating is to "feed your body."

In taking up the subject of salivary analysis it is necessary to combine with the technique of the work a more or less general idea of the chemical changes which take place in living organisms, either plants or animals; to consider the chemical nature of the different substances used as food, and to follow the changes which this food undergoes during its absorption and assimilation in the organism; finally, to consider the products eliminated by this process.

In studying the chemistry of the human body and the chemistry of foods, one may learn to put the two together. I mean by this, that one may be taught how to select, combine, and proportion his food in order to produce chemical harmony in the stomach. This means normal digestion, assimilation, and excretion—if the food is properly masticated—and these would mean a long stride toward perfect health.

These chemical changes taking place in the organism are either normal, as in health, or abnormal, as in disease. The abnormal products formed by these

changes are usually termed "pathological products."

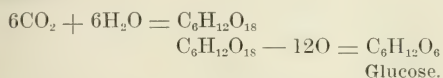
As we know, plants take up as food a small number of inorganic substances, such as carbon dioxid, water, ammonia, NH_3 , nitrates, and the phosphates, sulfates, and chlorids of calcium, magnesium, sodium, and potassium. These are converted into organic substances of a more and more complicated composition with the simultaneous liberation of oxygen, while we as animals take up these organic vegetable substances of a complex composition, assimilating them in our system, where they are used (burned up), and finally discharged as waste products, which are identical, or nearly so, with those substances serving as plant food, viz, carbon dioxid, water, urea, CON_2H_4 , urates, $\text{Mx.C}_5\text{H}_2\text{N}_4\text{O}_3$, and phosphates, sulfates, and chlorids of calcium, magnesium, sodium, and potassium.

Let us consider for a moment the source of the elements taken up by the plant for the formation of the organic matter: All *carbon* is derived from carbon dioxid; *hydrogen* chiefly from water; *oxygen* from either carbon dioxid or water, as well as from the various salts; *nitrogen* either from ammonia or from nitrates or nitrites, and *sulfur* and *phosphorus* from sulfates and phosphates. These elements enter the plants chiefly by the roots. The assimilation of the necessary mineral constituents is brought about by an acid secretion discharged from the roots, which has a tendency to render soluble these salts, which are present in the soil and surround the roots.

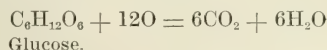
Water, having absorbed more or less of the soluble salts, enters the plants as stated, by the roots, and by a simple pro-

cess of diffusion is carried to the various green parts, chiefly the leaves, where the sunlight produces chemical decomposition and the formation of new compounds, and oxygen is liberated directly through the leaves to the atmosphere.

May we not therefore assume that the various compounds above mentioned are formed by decomposition with the liberation of oxygen as per the following equation:



—representing a constructive chemical change, while if we take



—representing in the animal system a process of chemical decomposition as a destructive change; that is to say, the substances formed in the plant are taken into the animal system, where they are gradually oxidized by the inhaled atmospheric oxygen, thereby being converted into simpler forms of combination, which are finally eliminated as waste products.

The tissues of the body are built up, and the energy is supplied by what we call animal food. This food, aside from water and a few of its mineral constituents, is all derived from vegetables, but may be taken either directly or indirectly after its previous assimilation by other animals, in the form of meat, milk, eggs, etc.

It has been found that only fifteen out of the seventy-six known elements are necessary constituents of the animal body, viz, carbon, hydrogen, oxygen, nitrogen, sulfur, phosphorus, chlorine, iodine, fluorine, silicon, calcium, magnesium, sodium, potassium, and iron. Although a few other elements are at times found in the system, they cannot be looked upon as normal or necessary constituents.

Our various foodstuffs are derived chiefly from organic compounds—carbohydrates (sugars, starch, etc.), fats, and proteid or nitrogenous substances—while the inorganic substances, as phosphates, chlorides, etc., required for the construction of bone tissues and for the

liberation of hydrochloric acid in the gastric juice, etc., are usually derived from various kinds of food or drinking-water. Milk is claimed by many to contain all the necessary organic and inorganic constituents.

We are all more or less familiar with the process of digestion, absorption, assimilation, destructive metamorphosis and elimination of waste products, although we may not thoroughly understand the complicated changes taking place in the animal system. We know that numerous products are formed and organs are nourished from the blood, viz, excretions and secretions, such as milk, saliva, bile, etc., the muscle, nerve, and brain substances, together with bones, teeth, hair, and many others, and that most of these substances suffer constant oxidation in the system, and are finally eliminated as waste products. Those eliminated by the lungs are chiefly carbon dioxide and water; by the kidneys, urine, which is a weak aqueous solution of urea, uric acid, urates, and phosphates, chlorides, and sulfates of calcium, magnesium, sodium, potassium, etc.; by the skin constantly, carbon dioxide and water; by perspiration, many of the constituents of the urine.

If analyses of blood and urine, whose chemical compositions are known to change very rapidly, can be of assistance in the determination of disease, why should not the saliva be a more stable medium of diagnosis, by means of chemical and microscopic examinations?

Urinalysis was not developed and perfected in a single year, or perhaps a single century, and salivary analysis will require its share of search and research, success and failures. But when so many are giving this branch of work their attention and thought, it is impossible that accurate and satisfactory diagnosis of disease should not in the future be made from the saliva, and that by suggesting to the afflicted to use only such foods as will enter into the correct chemical combinations in the process of nutrition, better health should not be placed within the reach of all.

The crystallogical part of the work under consideration fascinating me most,

I have been giving this branch the most time and attention. This necessitated much time and study of the crystal formation in its various systems, viz, the regular, quadratic, rhombic, hexagonal or rhombohedral, monoclinic, and triclinic.

We will therefore leave the chemical examination and tests for the normal constituents of mucin, albumin, ammonia, sulfur, chlorin, glycogen, etc., and the abnormal constituents of acetone, lactic acid, etc., to the many who are working along that line, and consider some of the crystallizable salts.

CRYSTALLIZABLE SALTS FOUND IN THE SALIVA.

The most abundant dialyzable salts found in the normal saliva are the chlorids of ammonium, potassium, and sodium, sulfate of potassium, carbonates of sodium and calcium, and the phosphate of calcium, held in solution by CO_2 .

Ammonium has probably never been isolated, yet its existence in ammoniacal compounds is almost universally admitted. The ammonium hypothesis is based chiefly upon facts such as the close resemblance of its compounds to those of potassium and sodium, and that when ammonia gas and an acid gas come together they unite, without liberation of hydrogen, to form an ammoniacal salt.

Sodium chlorid is found in solution in all natural waters, and forms a constituent of almost all animal and vegetable tissues and fluids. It enters into the formation of all tissues and secretions of the body with the exception of the enamel of the teeth, forms sixty per cent. of the salts of the blood, furnishes chlorin for the hydrochloric acid of the stomach, thereby aiding digestion, produces the alkalinity in the blood, stimulates the action of the kidneys, and acts as a mild laxative.

Potassium chlorid occurs in sea-water and brine-springs, and in plants. It resembles sodium chlorid in appearance and taste, but is more soluble. It is next in importance to sodium chlorid, is widely distributed in the body, but occurs in

much smaller amounts. Potassium chlorid is most abundant in the muscles, but is also found in other tissues and secretions.

The *sulfur* of the body is derived chiefly from egg-albumin, milk, and certain vegetables, occurring as sulfates.

Sulfur is a constituent element in most of the proteids, and in some form, therefore, it will be represented in the end-products of proteid metabolism in an oxidized form as inorganic sulfates, or in mineral sulfates ingested with food. The so-called conjugated or ethereal sulfates are combinations between sulfuric acid and indoxyl, skatoxyl, phenol, and cresol, which are formed in the large intestine as a result of bacterial putrefaction. They are eliminated in part in the feces and partly by absorption into the blood, and after oxidation are conjugated with sulfuric acid and eliminated in the urine. The process of conjugation is valuable from a physiological standpoint, as it converts substances having an injurious action into harmless compounds.

Some of the sulfur may occur in unoxidized form as sulfocyanid, and under pathological conditions sulfur may be excreted in the form of cystin.

Calcium salts are important on account of the extent to which they enter into the composition of the bones and teeth. They are introduced into the body through food and water.

Phosphorus is found in the muscles, bones, and blood; it occurs as a phosphate in both animal and vegetable food, as well as in the product of the destruction of phosphorus-containing tissues.

Iron is an important constituent of the hemoglobin of the blood and muscle fibers, although very little iron is necessary for the maintenance of health. Some cases of anemia are said to be due to deficiency of iron, and to be benefited by its administration.

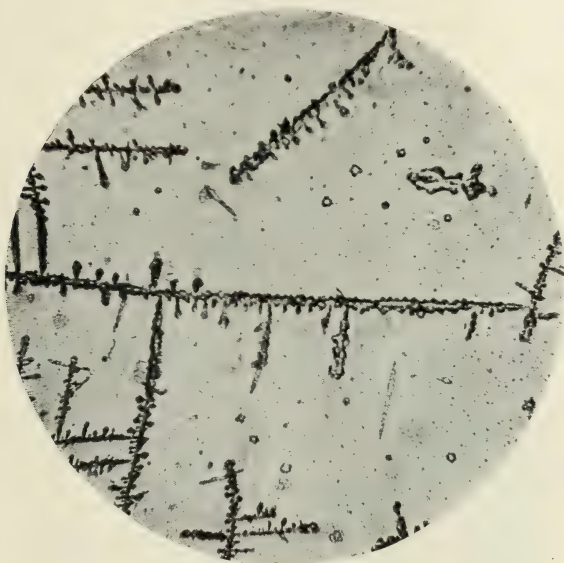
GLAND SECRETIONS CONTRIBUTING TO MIXED SALIVA.

Mixed saliva, according to Foster, has a specific gravity of 1.003, and is the result of the mingling in various propor-

tions of saliva from the parotid, submaxillary, and sublingual glands with the

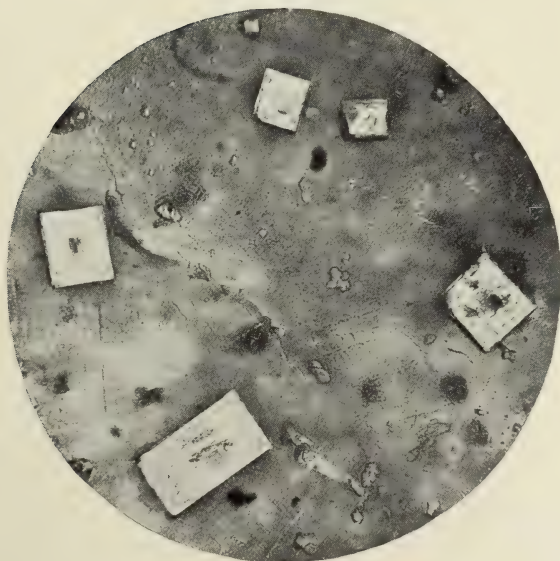
perties in the same individual according to circumstances.

SALIVA: FIG. 1.



Faulty metabolism.

FIG. 2.



Insufficient oxidation.

secretions from the buccal glands. This secretion differs in composition and pro-

Parotid saliva in man is clear and limpid, not viscid; and the natural secre-

tion is alkaline. Upon standing, the precipitate is calcic carbonate due to the escape of CO_2 , but it contains little or no mucin.

Submaxillary saliva differs from parotid in being more alkaline, and, owing to the presence of mucin, more viscid.

Sublingual saliva is more viscid and

Mucin is a substance containing no sulfur, and existing in the different varieties of mucus, in certain pathological fluids, in the saliva, bile, connective tissue, etc. Its solutions, like the fluids in which it occurs, are viscid.

Albumin occurs normally in all the body fluids, except in the urine. The

FIG. 3.



Nervous prostration.

contains more salts than submaxillary saliva.

The characteristic property of saliva, aside from serving to moisten and soften our food and thereby assisting in mastication and deglutition, is its action of converting starch into some form of sugar. This exceedingly active substance has never, to my knowledge, been satisfactorily isolated, and has been called ptyalin. Its action is best carried on when the mixed saliva is alkaline or nearly so; therefore this may represent, for our work and study at least, a normal reaction, although its action is well carried on in a neutral medium. A strongly alkaline solution retards or entirely inhibits its action, while a strongly acid reaction not only retards its action, but destroys the ferment itself.

amount found in milk is extremely slight; the amount in saliva seems to vary in inverse proportion to mucin.

Fat cells in the saliva come chiefly from the epithelium of the mouth. Spherical cells or salivary corpuscles come from altered leucocytes.

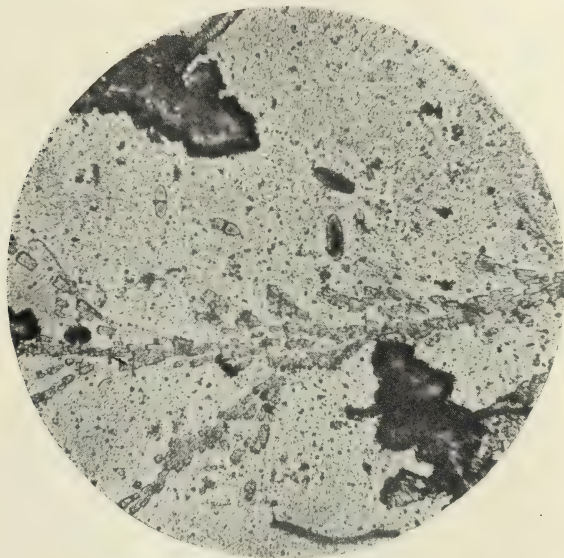
PATHOLOGICAL CONSTITUENTS OF THE SALIVA.

Pathologically we find in the saliva the many varieties of uric acid salts, urea, cholesterin, bile pigments, iodids, xanthin bodies, acetone (as iodoform crystals), lactic acid (as lacto-phosphates), and sugar, lactose, and glucose.

Under the head of *nitrogen eliminations* let us consider—(1) The urea nitrogen. (2) The ammonia nitrogen.

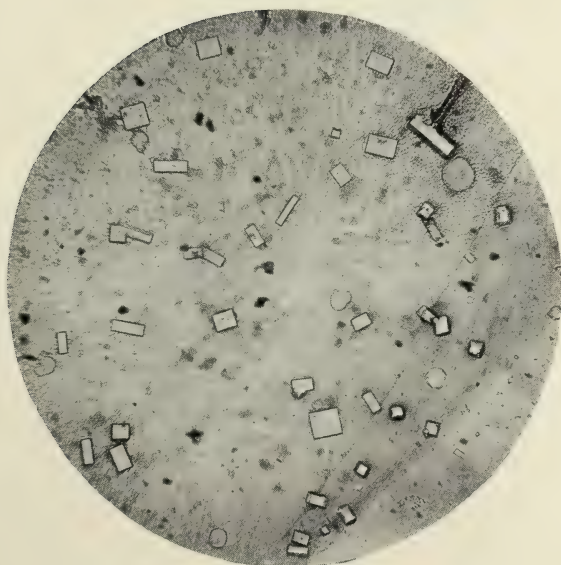
- (3) The creatin nitrogen. (4) The purin-body nitrogen. ological metabolism of the proteids and albuminoids of the food and the tissues.

FIG. 4.



Heavy proteid diet.

FIG. 5.



Vegetable diet.

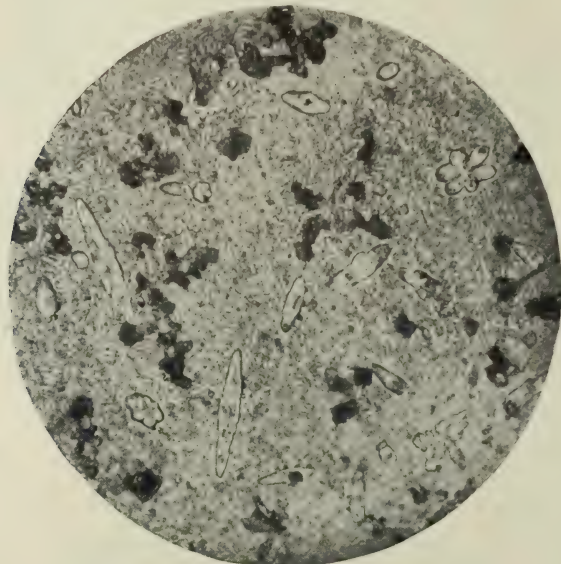
- (1) Urea is the chief end-product, so far as nitrogen is concerned, of the physi- (2) Urea arises from ammonia salts, which in the liver are converted to urea

by a process equivalent to dehydration, and since the cells of many proteid tissues of the body contain intracellular enzymes capable of causing hydrolytic cleavage to the proteid molecules, it is probable that some ammonia may be thus formed in various parts of the body; and so far as it is produced it will be converted to urea by the action of the liver,

and the absolute amount of urea nitrogen in the urea varies directly with the amount of proteid taken as food, while other nitrogenous constituents of the urin (creatinin, purin-bases) are practically not affected by the food, if care be taken to have the food free of these substances to begin with.

Folin has laid emphasis upon this

FIG. 6.



Pyorrhea.

and possibly by a similar action in other tissues.

(3) Urea arises from the monamino-acids by a process of deamidization by which the NH_2 group is converted into ammonia and then probably into urea. May not the organic acid radical that remains suffer oxidation, and thereby furnish heat energy to the body, or possibly be stored up, after synthesis, as carbohydrate, glycogen, or fat?

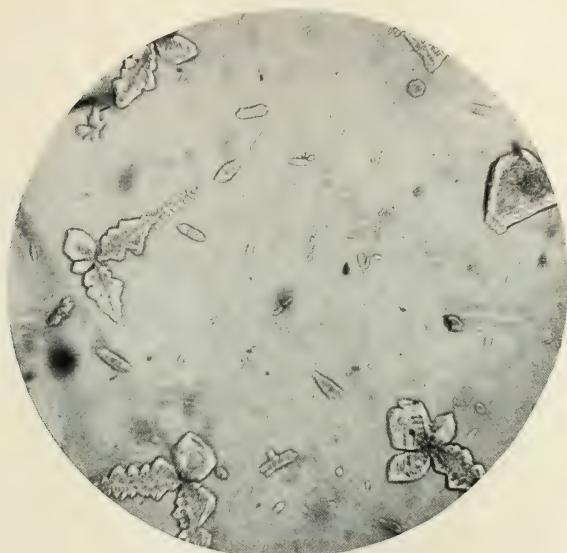
(4) Urea arises from further metabolism of uric acid, as not all of the uric acid produced in the body is excreted as such, a portion being further acted upon by a uricolytic enzyme and converted into urea.

It is a very significant fact that a rel-

fact, and suggests that most of the urea may come directly from proteid of the food, which is hydrolyzed during digestion and absorption, by the action of trypsin and erepsin, into simpler amino-acids. These amino-bodies, by further hydrolysis and oxidation, may be converted, as far as their nitrogen is concerned, into ammonia compounds, and eliminated at once by the liver as urea, without entering into tissue formation at all.

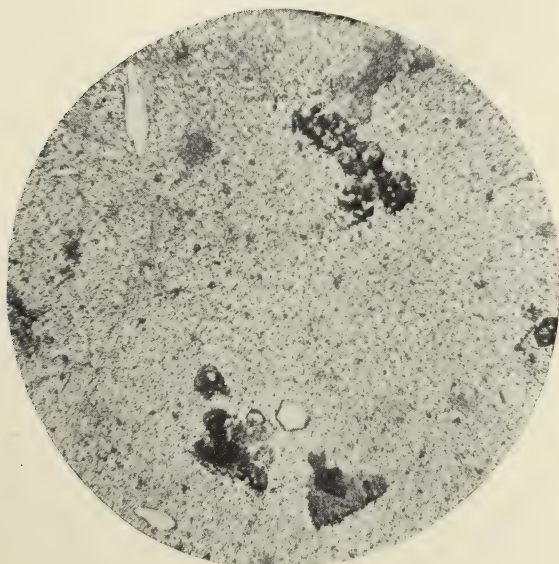
Even after the removal of the liver, some urea is still found in the urine. Therefore it seems as though the urea-forming power of the liver is shared by some of the other tissues, just as its glycogenic functions are.

FIG. 7.



Pyorrhea.

FIG. 8.



Pyorrhea.

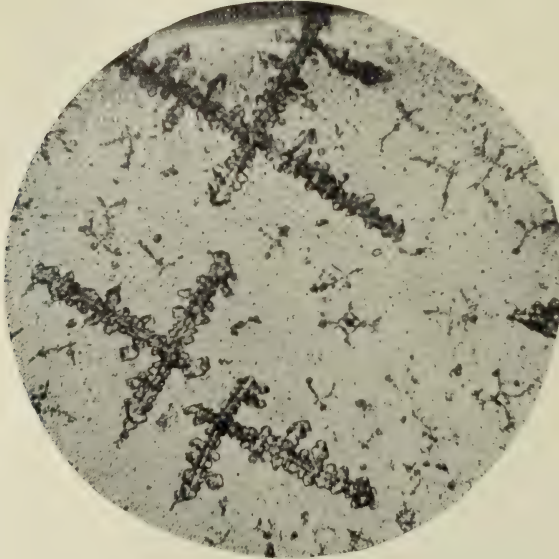
Purin bodies. These bodies are related chemically, and are designated by Emil Fischer by the term purin, as having a common nucleus, viz:

Nucleus.....	$C_5H_4N_4$	... Purin.
Adding 1 atom O, giving	$C_5H_4N_4O$	... Hypoxanthin.
“ 2 atoms O, “	$C_5H_4N_4O_2$	... Xanthin.
“ 3 “ O, “	$C_5H_4N_4O_3$	... Uric acid.

Caffein, the active principle of coffee and tea, and theobromin, the active prin-

Uric acid is a more complex body than urea, one molecule of uric acid split-

FIG. 9.



Caries.

FIG. 10.



Abrasion.

ciple of cocoa, are respectively trimethyl and dimethyl compounds of xanthin.

ting up, under the influence of certain reagents, into two molecules of urea and

a compound of oxalic acid. It is a weak dibasic acid, occurring in the body fluids not as a free acid, but as an acid salt combined with potassium and sodium, and to a less extent with calcium and ammonium. Many of the well-known urates, precipitated at body temperature, may be decomposed after the fluids cool, and thus give rise to crystals of uric acid. However, uric acid, or its salts, often constitutes largely the substance of the urinary or renal calculi, also the so-called gouty concretions of sodium urate formed in various parts of the body, more especially at the joints.

According to Burian, muscular activity is followed within an hour or two by an increased output of uric acid. Is it not possible, therefore, that under normal conditions the uric acid and other purin bases are derived mainly from a metabolism of the muscular substance, whereby hypoxanthin is produced, this substance then being oxidized into uric acid and a part of the uric acid being further changed to urea?

Creatinin: The physiological history of creatinin is perhaps imperfectly known. However, creatin is a constant and considerable constituent of muscle, and a fair inference, therefore, is that it originates in this tissue from the catabolism of the muscle substance, and is subsequently given to the blood and excreted as creatinin.

A difficulty in regard to this hypothesis is found in the fact that the mass of muscular tissue in the body contains a relatively large amount of creatin (90 grams), and yet only 1 to 2 grams are excreted in the urine during one day. On account of this disproportion it has been suggested that some of the creatin may be converted into urea, but no proof has

been furnished as yet that the body can accomplish this transformation.

Creatin given in food is, according to some observers, eliminated as creatinin.

Michaels states that glucose, biliary pigments, and leucin are found in the saliva, but only under pathological conditions. Glucose, he states, is responsible for many special forms of oral changes, among which are the softened and bleeding gums, the stale and fetid breath, and the denuded teeth. He also states that fatty and uric acids, lactic and oxalic acids, acetone, and sulfocyanids are the acid matters which have a great affinity for the calcium of the teeth.

The hypothetic action of alkaline sulfocyanids of potassium and ammonium is as follows: They dissolve the osseous of the teeth, expose their mineral elements, and unite with them to form sulfocyanid of calcium and soluble phosphates of potassium and ammonium.

Cholesterin occurs pathologically in biliary calculi, dropsy, and the waste products of various tissues. It also exists in the vegetable world in peas, beans, olive oil, wheat, etc.

Bile salts occur pathologically in the saliva as two acids, viz, taurocholic and glycocholic, existing principally as sodium or potassium salts.

The *bile pigment* (bilirubin) is derived from the coloring matter of the blood.

The appearance of bile salts in the saliva is indicative of pathologic conditions of the liver or bile-ducts, causing an obstruction to the outflow of bile or a destruction of the red blood corpuscles.

Leucin is formed in one of the steps in the transformation of at least some of the albuminoids into urea. It is a product of the decomposition of food.

SENSE AND NONSENSE AS TAUGHT IN AMERICAN DENTAL SCHOOLS.

By EUGENE S. TALBOT, Chicago.

Made still a blund'ring kind of melody;
Spurr'd boldly on, and dash'd through thick and thin,
Through sense and nonsense, never out nor in.

—Dryden.

THIS subject was suggested by Prof. James Truman's paper, "Wanted!—A Pathological Sense,"* in which he made the following statement: "The man with a clear pathological intuition is seemingly a rare production in our ranks, if we are to judge by the serious mistakes presented in almost every line of dental operations." Why should he blame the poor misguided graduate for not being possessed of a pathological sense? In other words, why did he not lay the blame where it belongs, namely, on the education of the dental student in the dental school. Water cannot flow higher than its source. The dental graduate should not be expected to nor could he possibly know more than his teachers. A large per cent. of the papers and books (outside of those dealing with the mechanics of dentistry) that are read and published reflect the teaching and the teacher, since no original thought is displayed by the authors along biologic lines. It is only necessary to attend dental meetings (national or state) to notice the drift of the profession. Examine the program of any one of these meetings and you are reminded of circus side-show advertisements, announcing the attractions in large type and flaming colors. The profession for the last twenty-five years has been gradually drifting and drifting, because dental school teachers have made mechanics the principal goal.

Yes, Dr. Truman is right,—“Wanted! —A Pathological Sense.” But who are the members of the profession that need that pathological sense more than any other? If our profession is to be recognized as a part of the healing art, if the practitioners of dentistry are to acquire a knowledge sufficiently broad to render the best possible service to the laity, it is the teachers in our dental schools that require the “pathological sense,” and not the nonsense that is given so much time in present methods of teaching and is laid down in the text-books. “Sense and nonsense” are milder terms than I should use were I to discuss the subject of this paper offhand as applied to dentistry. “Science and ignorance” would indicate more directly the thought I wish to convey.

There are some good dental schools and there are poor dental schools. There are good dental teachers and there are poor dental teachers. The environment, however, is the same in all the schools. The teachers of the better schools which keep the standard down make the excuse that they must stand by the weaker schools, thus keeping all schools upon a low educational basis; also by this method the teachers are not compelled to study and keep posted on the latest research. A professor of more than forty years' standing and principal owner of a dental school, in closing the discussion of a senile paper he had read in a dental society upon a subject which he has been teaching all these years,

* COSMOS, August 1907, vol. xlix, p. 815.

in reply to a sharp rebuke for such antiquated ideas, said that he "had not the time to do research work." This is a very poor excuse for a teacher who is preparing students every year to go forth into the world to relieve humanity of their sufferings. This teacher could, were he so disposed, read the reports of others who do find time to do research work and profit thereby. But for some reason—which is not hard to define—he has failed to do so. Students, therefore, who graduate from his institution are sent out into the world with many of the ideas of the ancients.

What is true of this teacher and his school is also true of others. Instead of dental teachers being educated in biologic subjects so as to be able to decide if research work done by others is logical and reasonable, and to give credit for such work (as is the case in all other departments of science) and adopt it in their own teaching, they know nothing of the subject under discussion, and care less. The mechanics of dentistry is good enough for them, and being good enough for them is good enough for the student, regardless of the fact that the world is progressing and that more is demanded of the dentist today than when these teachers began practice.

As time goes on and our knowledge increases, the dental graduate must have a better conception of the general system, for every pathologic condition of the mouth is dependent upon the patient's general health.

Since "Swan Songs and American Dental College Degeneration"* appeared, some teachers have been singing swan songs with renewed strength and vigor. The reason is obvious for this fresh outburst of song. The old swan is growing more senile every day. Hypodermic injections of saline fluids and nitroglycerin are necessary to keep the heart beating in the old swan (schools of mechanics) and prevent the death of the bird "that laid the golden egg."

Let any stomatologist or group of

stomatologists discuss the subject of a better and a more thorough education for the dentist, and immediately guardians of the "schools of mechanics" commence to sing. Three favorite songs are, first, "Medical college teaching is faulty," and therefore excuse enough for faulty dental college teaching; second, the "touch system," and third, "The medical graduate is not as well qualified to practice medicine as the dental graduate is to practice dentistry."

Apparently, little impression was made upon the songsters by my paper, hence I am taking up the subject again and trying to promote the importance of reorganization of dental teaching. To answer the first song, the teacher who will try to excuse his own shortcomings or those of his school by the contention that other individuals or schools are faulty is within the pall of ignorance.

In dental teaching, discussion, argument is never heard in favor of improvement as in other educational lines. Each year, teachers of all schools—public (including high), law, medicine, and theology—meet to discuss advancement. Not so with the dental teachers. Commercialism is apparently the god, first, last, and all the time. The great question is how to prevent improvement and reduce the cost of teaching to a minimum; hence the swan songs.

The meeting of the Institute of Dental Pedagogics held at New Orleans, December 31, 1907, is a splendid illustration of this thought. Papers and discussions bristle with these ideas. To quote from one: "While dentistry is closely connected with general medicine, a full and comprehensive knowledge of all branches of the latter is not needed for its successful practice. At the meeting of the F. D. I. held in Stockholm in 1906 the following studies were selected as being essential to the general education of the dentist: Physics, chemistry, anatomy, histology and embryology, physiology, physiological chemistry, bacteriology, materia medica and therapeutics, general and special pathology, general and special surgery and physical diagnosis. These general medical branches, to-

* Cosmos, March 1908, vol. 1, p. 232.

gether with the special dental training, will prepare the student far better to enter upon the actual practice of dentistry than if he were to possess a complete knowledge of the whole field of medicine."

How much more has he to learn to obtain a medical degree? Will a partial medical training prepare the student "far better to enter upon the actual practice of dentistry than if he were to possess a complete knowledge of the whole field of medicine?" The essayist answers this question in closing his discussion. He says, "We are constantly graduating men who are going to European countries who stand absolutely without any foundation. The medical graduate of the country to which he goes has every privilege and has many more that the dentist does not have, and yet we have apparently said or done nothing to relieve them. We have been relegated into oblivion by the Society of Stomatology. Some expression ought to come from this body. This is the teaching body, and, as such, to this body will the profession of the future look as to the outcome of the profession of dentistry."

Why not form trades unions, ye teachers of mechanics, and place yourselves on record, pass rules and regulations asserting the authority of the D.D.S.? Why undertake to teach "physics, chemistry, anatomy, histology and embryology, physiology, physiological chemistry, bacteriology, materia medica and therapeutics, general and special pathology, general and special surgery and physical diagnosis?" Why waste the precious time and money of the teachers and students of the college, since they would be only partially taught and would receive only a partial degree of culture? The conferring of such a degree after a student has spent four years of study would represent only a half-cultured graduate. This is the reason why the medical schools of America have refused to allow the graduate of dentistry one year toward a medical education. Is not this a snub for the present methods of dental college teaching? A poorly educated practitioner with an M.D. degree always stands

better in a community, both socially and professionally than the best of educated dentists with the D.D.S. degree only. This is and always will be the case, since the medical profession will never recognize, as an equal, a practitioner with the badge of an inferior degree. This argument has been recognized and reiterated many times even by dental teachers.

Will the profession look upon the teaching body for its future outcome? This will depend upon the wisdom of that body. If it does not improve more than it has in the past twenty-five years, I am afraid not.

Have we been relegated into oblivion by the Society of Stomatology? Yes, since the meeting of the International Association of Stomatology, August 1, 1907, through its influence great changes have taken place and are about to take place in European countries in relation to the practice of dentistry, as I anticipated in a previous paper.

Schools of stomatology are springing up, and laws are about to be enforced requiring men to be medical graduates who treat diseases of the mouth. Already the Italian stomatologists have organized an Institute of Stomatology in which graduates of medicine will receive instruction in that specialty. This institute, which has been open since January 15, 1908, was temporarily established in the Clinical Institute of Milan, and was officially dedicated November 3, 1908. A similar institution is about to be established by stomatologists in France. In both these institutions only graduates of medicine are to be received as students.

A Vienna letter to the *Journal of the American Medical Association* on "The Regulation of Dentistry in Austria," says: "By a bill which will go into force in a few weeks the long quarrel between the dental surgeon and the now medical dentists will be settled. . . . The medical profession was unable to grapple with the situation because the law was inadequate. In fact, the position has become so bad for the dental surgeons that the dentists even disputed the doctor's right to make artificial teeth and to fit them in the

mouths of patients. According to them, nothing but purely surgical dentistry—extractions and operations on the alveolar process—should be the domain of the dental surgeon. By the united efforts of the profession, who saw the danger of that sort of argument, the attack was repelled and an arrangement was agreed on stipulating that all present licenses of dentists should remain in force, allowing them, besides making artificial teeth, also to fill carious teeth; while all those who are not yet licensed qualified dentists will be licensed within three years. After that time, only medical men will be able to obtain licenses to practice dentistry.”

According to a report to the United States Government by the American consul to Belgium, a similar law will go into effect at about the same time. A law requiring dentists to be graduates of medicine will go into effect soon in Italy. Advanced steps along these directions in other countries are about to be taken. It will be seen, therefore, that the teachers of mechanics in this country are still napping. Would it not be well for those teachers who will not wake up to the situation, to let their institutions remain as they are and receive students who are medically educated, to perfect them in the mechanics of their chosen calling?

Other countries are awake to the fact that diseases of the face, jaws, and teeth go hand-in-hand with other diseases of the body, and are making provision to educate men to cope with the advance made by scientists. The teachers in American dental schools, Rip Van Winkle like, will wake up some day to find their laurels gone.

The second song, the “touch system” (Gray), has worked successfully so many years that it has become a nursery rhyme. Any advancement or improvement in dental teaching suggested by stomatologists (always looked upon as *parvenus*), is answered by the immediate singing of the above nursery rhyme. One professor has “gone daft” on this particular song. He has sung it so long, so often that it is almost a byword with him, the main point being the earliest training possible at which the student is

to commence his “finger and arm gymnastics.” He pushes this idea so far that he would even have the fetus, as soon as bone and muscle formation permit, beat the walls of the uterus to obtain that “delicacy of touch so necessary” in mechanical manipulation. The songster does not consider the agents located throughout this country and Europe who solicit ungainly, impracticable, unteachable, ignorant candidates to fill the “diploma mills” and become the future so-called professional men.

The third song, “The dental graduate is better prepared to practice dentistry than the medical graduate is to practice medicine,” depends upon what constitutes dentistry. If making artificial dentures, extraction, crown and bridge work, filling teeth, etc., constitute dentistry, then I agree with the author of that statement. If, on the other hand, the treatment of deformities and diseases of the mouth due to or associated with other pathologic conditions of the body is a part of dentistry, then the statement is not tenable. That such statements can conscientiously be made must be due to the ignorance of the author. To prove the falsity of this third statement, I have only to discuss one condition of the mouth. All admit oral hygiene to be one of the most important branches of science. The mouth being the vestibule through which all nourishment and in some cases much of the air we breathe enters, it stands to reason that this organ should be kept scrupulously clean and healthy. Yet, with all the boasting of dental teachers of their ability to teach dentistry, the very condition of the mouth, most important to the physician, surgeon, and dentist, is not taught to any appreciable extent in any dental school. At least the graduate has had little or no impression of the subject made upon him in the dental school.

Each article published on oral hygiene is identical. Only a small per cent. of the dental profession practice first principles. They do not know or practice oral hygiene, because it is neither taught nor practiced in dental schools. The dental student may or may not have heard lec-

tures upon the subject. The papers read by teachers in public, the discussions, the condition of the mouths of patients, the text-books, and general methods of practice, or rather want of practice, show this lack of knowledge on the subject. The student goes from the classroom into the infirmary with an uncleanly mouth; he operates upon uncleanly patients. Practicing what he ought to have learned or is supposed to have learned of oral hygiene in the classroom is never considered in clinics, therefore dental students give their office patients but scant justice. Patients with inflamed and puffy gums, bleeding upon the slightest touch, thick ropy saliva and fetid breath, are operated upon until all mechanics have been performed, and no attention is paid to mouth pathology and cleanliness. Such lack of oral hygienic training does not fit the graduate to undertake and succeed in office practice. Many times in clinics I have called attention to the uncleanly mouths of students and patients, and have asked why these mouths are not in a healthy condition before the mechanical operations are performed. The students' reply has always been that they were "not required to do so."

Teachers in the dental schools do not seem to comprehend what oral hygiene means, much less teaching it. In a conversation with five teachers of different schools, two of whom were deans and three taught pathology, each resented my statement that not one dental college in the country taught oral hygiene. Each assured me that *their* college did teach it and therefore their school was an exception. In no case was I able to convince them that they were wrong. I visited each clinic afterward and found that not one student who was operating had any conception of what oral hygiene meant. If these students had really heard lectures upon the subject, the lectures were "lost upon the desert air."

This condition of affairs should be condemned, for the oral cavity is the most prolific germ-collector of the body. Many diseases are due to uncleanly mouths. A. H. Levings* demonstrated

that germs of the mouth produce tuberculosis, actinomycosis, osteomyelitis, thrush, anthrax, erysipelas, ulcerative and gangrenous stomatitis, pyorrhea alveolaris, and caries. His experiments, together with cultures from the mouths of thirteen patients suffering with hare-lip, epithelioma, carcinoma, sore mouth, sore throat, acute pharyngitis, canker, tonsillitis, tuberculosis, and pyorrhea alveolaris, showed large quantities of pyogenic and pathogenic germs, to say nothing of other germs and inflammations. Dr. Harvey Cushing of Baltimore first showed the importance of sterilization of the mouth in operations upon the stomach and alimentary canal. In these days of prophylaxis, when so much is written and discussed in regard to cleanliness of the body, what can be thought of a specialty avowedly devoted to the study of the diseases of the mouth and teeth, which does not teach or practice oral hygiene?

Oral hygiene should be one of the principal subjects of lecture-room and clinic teaching. Signs in large type, "Oral, personal, and college hygiene," should be placed in all college rooms, so that teachers and students should not forget or ignore this most important factor of health. Many dental college operating rooms are very dirty. They should be as clean and aseptic as surgical operating rooms. After students have been properly educated in the theory of hygiene in the lecture room, they should return to the clinic and put into practice what they have learned and heard in the lecture room. The venerable adage, "First cast out the beam out of thine own eye, and then shalt thou see clearly to cast out the mote out of thy brother's eye," is a good motto. Students should first operate upon each other and upon the teachers, placing the mouths in a healthy condition. By instruction in the classroom and personal clinical observation they should be competent to put the mouths of their patients in a thoroughly hygienic condition before attempting dental operations. Such examples as those demonstrated by Gordon White of Nashville and D. D. Smith of Philadelphia are none too good for teacher, student, and practitioner.

* "Surgical Bacteria of the Mouth."

Dental teachers on pathology and hygiene may be compared to the army surgeons in the late Spanish-American, English-Boer, and Russo-Japanese wars. These surgeons knew very well what hygiene meant to the soldiers in relation to disease, yet camps were constructed in such manner that sixty-five per cent. of avoidable illnesses occurred in the American army, and a large percentage in the English. What a comparison with the Japanese in their war with Russia, where only about two and one-half per cent. of illnesses occurred! The Japanese surgeons not only knew but they put into practice what they knew. Dental teachers know that they are not teaching as they should, and they also know that the dental graduate is not obtaining that for which he has paid his money or what he should expect. The commercial side of the problem seems to have the most weight.

DO TEACHERS NEED "A PATHOLOGICAL SENSE"?

To demonstrate that I am correct in my deduction, it is only necessary to review the literature for the past year and note the lack of proper training of some dental teachers as demonstrated by the nonsense therein contained.

Two professors, in discussing interstitial gingivitis in different societies, stated that interstitial meant between the teeth, and as pyorrhea alveolaris extended around the tooth, the term could not possibly be correct. The premises of these teachers being incorrect, the entire argument was useless. Another professor, in discussing mouth degeneration, had brought a number of casts of cleft palate to the meeting. He said that he had made a complete study of degeneracy, but that none of the persons whose models he exhibited were degenerates. Still another teacher has established a factory for the express purpose of manufacturing a special pathology to exploit pet theories. A professor of orthodontia teaches his students that protrusion of the jaws is due to the use of forceps in delivery—the force used in traction causes the jaws

to protrude and produces other malformations.

One of the most senile articles written lately is the chapter published on page 451 of Prof. C. N. Johnson's work, "A Text-book of Operative Dentistry." Not content with inflicting his prehistoric ideas on his own students, the author must incorporate them in a text-book, which poor students of other schools are compelled to study and to use as a basis for future methods of treatment! To show that this teacher is dealing out chunks of knowledge from the ancient tombs of the Egyptians and is still living in the dark ages, it is my purpose to analyze a part of the chapter.

Regarding the subject, "pyorrhea alveolaris," at least six or eight progressive dentists (who have given considerable thought to it) have called attention to the fact that the student could not understand the various inflammations of the alveolar process which take place from eruption of the deciduous teeth until the permanent ones are shed. Pyorrhea alveolaris is not a disease, but the result of a disease; inflammation is located in the alveolar process most of the time, while pyorrhea is only occasionally observed. The author of this article, then, is not only oblivious to suggestions made but is unable to comprehend the latest researches. The first paragraph of the chapter is unique. The author says, "The work of writing upon the subject of 'pyorrhea alveolaris' in a way to enable the dental practitioner to more successfully cope with that most distressing and destructive condition surrounding the dental organs becomes difficult only on account of the fact that members of the dental profession have so often been led to believe by a majority of the writers upon the subject that the disease is the expression of systemic conditions, and that until these conditions are corrected the treatment is well-nigh hopeless."

Why is it difficult to write on the subject? Is it because the author does not comprehend the systemic conditions, or is it because he cannot explain them? These systemic conditions are very common in a large majority of patients, but

he cannot, from his own viewpoint, understand these pathologic disturbances; hence he says that "the treatment is well-nigh hopeless." The author is not a student of disease. He has stated publicly that he has never made researches along this line. Even if he never made that statement his article would be sufficient proof. A "majority of the writers upon the subject" are thinking men and have done research work to prove their findings. Their conclusions, therefore, are worth more than those of a man who has done none.

The second paragraph is also interesting. The writer says, "The operator who is a student of disease, if he gives credence to these statements, is also well aware of the fact that the diseases of faulty metabolism, or those resulting in faulty metabolism—which, according to these writers, are largely causative of the condition known as 'pyorrhea alveolaris'—are diseases rarely cured, or even greatly modified; and we can then readily see that logically the operator hesitates to undertake a task which promises so little success to the operator or benefit to the patient."

This is a remarkable statement—that auto-intoxications "are rarely cured or even greatly modified." Faulty metabolism always occurs in pregnancy resulting in interstitial gingivitis. After the child is born, the system adjusts itself, and the faulty metabolism is corrected. Auto-intoxication takes place in all diseases, which is almost always removed when the patients get well. Auto-intoxication takes place from over-eating and drinking, which is corrected when the patient eats and drinks with moderation. The aim of the modern physician is to prevent or remove auto-intoxication. There never was a case where faulty metabolism caused pyorrhea alveolaris. Faulty metabolism causes inflammation of the alveolar process, and if pus germs be present they infect that part. If pus germs be not present the disease will continue and the teeth loosen and become exfoliated without pus infection.

The third paragraph is fully as remarkable as the first two: "At the outset

of this brief consideration of the subject, the author desires to state with a confidence based upon observation and experience for over twenty-five years, that the condition or disease commonly known as 'pyorrhea alveolaris' is amenable to treatment, effecting a cure as readily and satisfactorily as the other lesions of the dental organs, whether the systemic conditions which affect the progress of the disease are present or absent."

This statement shows the demarcation between the "tooth-carpenter" and the scientist. The "tooth-carpenter," after "twenty-five years' experience" can treat successfully, "readily and satisfactorily," pyorrhea alveolaris, "whether the systemic conditions which affect the progress of the disease are present or absent." Here he does admit that systemic conditions influence the disease. Interstitial gingivitis due to pregnancy, drug poison, metal poison, scurvy, and auto-intoxication due to disease or otherwise can be readily cured by local treatment. The question naturally arises, from his viewpoint, How can one tell whether the disease be cured or not? If the disease is of local origin, why do we find arteriosclerosis of the bloodvessels in so many patients suffering with interstitial gingivitis, as I have demonstrated and published? Can constitutional diseases be cured by local treatment?

Although this chapter is intended for the education of dental students, nothing is said of the etiology of this disease. Evidently the author "cannot see the forest for the trees." Nearly every paragraph of the entire chapter is open to similar criticism, but a separate analysis of each would render this paper too lengthy. To realize that the author is living in the past and knows nothing of modern researches, it is only necessary to read the article through and note the quotations. The senility of the entire article is readily seen when he quotes from his own article written in 1889 and also refers to the work of the late Drs. W. H. Atkinson and Riggs.*

* I do not criticize the estimable investigations of these two gentlemen in the early

For the treatment he refers to the "American System of Dentistry," published in 1886, and to the methods of the late Dr. Riggs. He does, however, speak of certain instruments, which are only modifications of those used by the early writers upon this subject. Are the researches of Michaels, Kirk, Gordon White, D. D. Smith, Peirce, Briggs, Rhein, of so little importance?

In conclusion, on page 470, under "systemic treatment," he says: "When pyorrhea is accompanied with any predisposition, whether hereditary or acquired" (here he admits again that there are systemic conditions) "which leads to the virulence of the disease, such systemic treatment for the correction of the predisposition as found advisable should always be relegated to the patient's medical adviser. It is a breach of ethics if the doctor of dental surgery invades the general field of medicinal treatment by the administration of internal remedies for the correction of faulty metabolism or systemic conditions from whatever cause."

This statement is put fairly before the dental profession, and is a fitting closing for an entire article of that character. It shows conclusively where the graduate of dentistry stands when he begins practice.

What will be the dentist's feelings on commencing practice after spending four years and acquiring all or nearly all the knowledge required of a medical student,

as recommended by the president of the Institute of Dental Pedagogics, when he finds that he is unable to treat systemically lesions of the mouth? It is an unfair advantage taken of the student, who has paid his tuition fees for the latest and best methods of practicing successfully his chosen profession.

It is such articles, written by incompetent men, that have prevented progress. It is such articles in our text-books that make these text-books unfit for use in dental schools. There are other chapters and articles published by teachers in the past year that are as unscientific and untenable as these, but the scope of this paper prevents further discussion. They will be considered later. Who requires the "pathological sense" more, the teacher or the graduate?

For more than fifteen years I have advocated and discussed the subject of advanced teaching with members of the best schools. The principal point suggested is that those dental departments connected with the best universities should unite and organize their own national body. Some of these teachers, being loyal to the weaker schools, have insisted that their institutions should stand by these schools. The point I have made is that, by this action, university dental teaching in the eyes of the laity and the profession is no better than in the weakest and poorest schools. I still maintain the point that the university schools must unite in a national body, and that the university and not the dean and the board of directors must decide the character of its teachers and their teaching.

study of this disease. Modern researches, however, have given us a better understanding of the etiology as well as the treatment of pyorrhea alveolaris.—E. S. T.

FIXED APPLIANCES IN ORTHODONTIA.

By **SHIRLEY W. BOWLES, D.D.S.,**

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(Read before the District of Columbia Dental Society at its December meeting.)

PROBABLY no branch of the practice of dentistry has advanced more in the last decade than orthodontia. Many things have contributed to its development. First and foremost is a deeper study into and the resultant increased knowledge of normal occlusion, together with the recognition of the importance of facial art and its relation to occlusion. Another important factor is the simplification and greater efficiency of the appliances and their intelligent use. And last, but not least, the education of the patient to the great benefits of this work.

As an instance of increased knowledge of the normal occlusion, Dr. Angle has given us a classification which tells us from a glance at correct models where the departure from normal occlusion exists, and what is necessary to correct it. And more than this, Dr. C. A. Hawley has shown us a most admirable method of determining the size and form of the normal arch for a given case. Thus we have a definite knowledge of the deformity and an accurate guide to its corrected form. It follows, then, that correcting the malocclusion must be done by definite and accurate means.

As far back as 1876, Dr. Farrar enunciated the principle that the force applied in tooth-movement should be positive and intermittent—a period of rest following a period of motion. This principle stands today.

It is a truth that a great predisposing cause of caries is malocclusion and malposition of teeth. If, then, the work of the orthodontist is complete with dentition, this one predisposing cause is re-

moved, and the work of preserving the teeth is made that much easier. In starting treatment for malocclusion "with the eruption of the first permanent molars, we gain immeasurably in ease of movement, the stability of retention and the improved function of the lips and nasal passages," etc., and we are following the spirit of the times in our profession, which is preventive dentistry.

However, cases do not always present in early childhood, and we are called upon for orthodontic services more often by patients beyond twelve years of age than before. Specialists today are recognizing more and more the superior advantages of starting treatment as near six years of age as possible.

Whether a case is corrected before dentition is complete or after, the appliance should possess certain qualities. It should possess (1) Efficiency, (2) simplicity, (3) least interference with mastication and speech, (4) cleanliness, (5) inconspicuousness, (6) stability, and (7) freedom from injury to tooth-structure.

Your essayist believes that the fixed appliance has these qualities in a larger degree than removable appliances.

QUALITIES ESSENTIAL IN FIXED APPLIANCES.

(1) The *efficiency* of an appliance means, "Is the force exerted positive?" Absolutely fixed anchorage is almost impossible to obtain in the human mouth. The study of the working of any appliance is the study of resultant forces, and these can be more definitely calculated in a fixed appliance. It seems clear that

with an appliance which is attached securely the resistance offered to the working force is more positive than with one not securely attached. With molar bands and arch-bar, and with a number of teeth ligated to it, the resistance is great and the anchor teeth are less liable to be changed in position than with removable fixtures. The proper use of the ligature in connection with the arch-bar makes it possible to obtain the intermittent force.

Efficiency also means accuracy. The old adage "If a thing is worth doing at all, it is worth doing well," applies here. No case in orthodontia is done well or perfectly unless the teeth are restored to their normal relation. This means that the chief dependence in retention should be placed on the proper mesio-distal relations of the jaws, and that the arches should be of normal width and length. Many times this means *root* movement, and always positive accurate movement, which is best obtained by fixed rigid anchorage, and this is more nearly obtained with the fixed appliance.

The demands for painless dentistry are as urgent in orthodontia as in general practice. The most efficient appliance, besides doing the work, does it with the least pain. With judgment and care the fixed appliance will cause little or no pain, which is a particular advantage in the light of preventive orthodontia. The little patients between the ages of six and twelve have only to become used to the fixture, and the operator knows that it will stay placed and do its work. The fixed appliance is more nearly painless because the force is positive and intermittent, and the moving teeth are never allowed to recede from their advanced positions, as is the condition when an appliance is taken from the mouth.

With the arch-bar a greater number of teeth can be maintained under perfect control and more movements accomplished at the same time with one fixture. The expansion arch, with its accessory intermaxillary anchorage, is capable of an almost infinite variety of results by variation in its application and management. This intermaxillary force, which

has come to play a very important part, cannot be applied to removable fixtures.

(2) *Simplicity.* The fixed appliances are made up of fewer parts and are usually simpler in form than others. The parts can be obtained from reputable manufacturers, and with little alteration can be adapted easily.

(3) *Least interference with mastication and speech.* If a removable appliance be made with a crib, the wire passing to the buccal surface rests between the point of contact between the teeth and the occlusal surface, and in many cases interferes with proper mastication. If the removable appliance be a plate it surely interferes with speech. The bands and bars of the fixed appliance can easily be adjusted so that no interference with mastication and speech is experienced.

(4) *Cleanliness.* In all cases of orthodontia the teeth should be polished by the operator at regular intervals. If this be done the fixed appliances are as clean as any other.

(5) *Inconspicuousness.* Except in cases where anterior bands are necessary, the arch-bar is as inconspicuous as is possible.

(6) *Stability.* This is one of the cardinal virtues of the fixed appliance. To the believers in them the stability of the fixed appliances is a great advantage over the removable.

(7) *Freedom from injury to tooth-structure.* This quality in an appliance is attracting considerable attention from all those engaged in orthodontia. Dr. C. J. Grieves of Baltimore read in November last before the American Society of Orthodontists in this city a very important paper, in which he showed conclusively that base-metal appliances did more harm to tooth-structure than the noble metals. Removable appliances are mostly made from the base metals. By attaching bands with cement or gutta-percha, by making appliances of the noble metals, and by polishing the teeth as often as necessary, no more injury to tooth-structure will follow the use of the fixed appliance than the removable one.

In the ultimate analysis, orthodontia

is not altogether a matter of fixtures—it depends upon the judgment and skill of the operator. This paper is brought forth in the belief that correcting malocclusion is more easily and perfectly

done with fixed than removable appliances, and with the hope that those who are using removable appliances will at least investigate the statements herein presented.

PREPARATION OF CAVITIES FOR GOLD INLAYS.

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(Read before the union meeting of the Fifth District and Jefferson County Dental Societies, Watertown, N. Y., November 6, 1908.)

IN the preparation of cavities for gold inlays, certain fundamental governing principles must be observed. Some of these principles differ widely from those observed in the preparation of cavities for filling by other methods. "Extension for prevention" must be observed; add to this "extension for convenience," and also "extension for anchorage and insertion." The latter two conditions may seem to be identical or for the same purpose, but as we shall explain later, they are not. Other governing principles control the shaping of the cavity in regard to its marginal shape, and still others have to do with the anchorage, with the location of the marginal outlines and marginal angles.

We shall, therefore, in this paper briefly treat the subject under these various heads.

Extension for prevention is observed and practiced by all up-to-date practitioners. The same manner of reasoning and procedure would obtain in cavity preparation for gold inlays as for gold fillings, except that an occasional instance may present when an outer plate of thin enamel in an anterior tooth may be allowed to remain for purely esthetic reasons, if an inlay is to be inserted. A wall of enamel that would be too thin to build gold against could have an inlay

placed against it and be reasonably durable.

By extension for convenience we mean that all cavity margins should be perfectly accessible to instrumentation, finishing the cavity margins with revolving stones or with chisels, perfecting the margins of the wax pattern, and burnishing the edges of the completed inlay. In an inlay operation so much depends upon a perfectly made pattern and on perfect margins in the gold inlay that too much stress cannot be placed upon the means and the possibility of shaping a pattern from which such an inlay can be made. A great deal of this possibility also depends upon the shaping and finishing of the cavity that is to receive the inlay. We believe that the margins of a pattern can be finished more thoroughly by means of burnishers than by matrices, tape, strips, or rubber. This means that enough space for the use of a burnisher must be present, and this reverts to cavity preparation. After all margins of the cavity have been shaped in accordance with this method of finishing the pattern, an absolute perfection of margins may be obtained, with it the definite knowledge that the margins *are* thus made. We are sometimes surprised at the appearance of a pattern after it has been removed from the cavity, and may be

tempted to reinsert it to make another observation. The cavity margins should be so accessible or visible as to prevent the possibility of surprises or the necessity of reinsertion, and also to admit of bringing about the ultimate feature of invulnerability of the inlay operation by burnishing the edges of the gold, while the cement is still soft, into such an approximation to the cavity margin that all traces of the cement line shall have been pinched off and obliterated.

Inasmuch as most of the inlays of gold are placed in such positions that they represent a part of the morsal surface of the masticating teeth, and also on account of the fact that the stress or force of mastication is greatest in this part of the mouth, it becomes necessary to have very secure anchorage. It is not wise to rely on the adhesion of the cement to provide the anchorage. Such an anchorage is reliable only if no part of the inlay is in a position where it receives any direct stress of mastication. Under certain conditions a cavity may be undercut after the inlay is made, and the inlay grooved at points exactly opposite the undercuts in the cavity, and a quite secure anchorage thus made. In most cases it is well to extend the cavity for anchorage. This is readily accomplished by extending it into the nearest fissure—which usually needs to be cut out anyway—and by finishing with an enlarged end. This extension need not be large, nor need it be cut deeply enough to materially weaken the tooth. The only force that will be exerted in such an anchorage *per se* would be a direct tensile strain. For this reason a very small extension of gold is sufficient to anchor a large compound filling so that it will resist the enormous force that might tend to dislodge it. In the anterior teeth this extension, if such were necessary, would be made in the palatal or lingual side of the tooth, and be of such extent as would seem discretionary with reference to the amount of anchorage needed.

The cavity should also be extended to allow the easy removal of the pattern and the insertion of the finished inlay. It is not well to greatly rely upon the use

of separators for gaining space for the convenience of insertion. Frequently the separator seems to be in the way, and may readily be the cause of preventing an otherwise good inlay from being properly placed in the cavity in cementing, and thus produce a failure; nor should the cavity be so secluded that an inlay must be made without the proper amount of contour in order that it may go in. Such an operation does not restore the normal shape of the interdental space, and thus is a failure. As a whole, the cavity should be slightly cone-shaped. This shape facilitates the removal of the pattern, the trying in, and the cementing of the inlay. A pattern may be taken from a parallel cavity or indeed forced from one that is slightly undercut; but the trying of an inlay into such a cavity may readily cause great difficulty by having it thus fastened into the cavity before it is cemented. The supply houses have a small cone-shaped carborundum point that is admirably adapted and intended for coning inlay cavities. It is made to fit all angular handpieces, and its manipulation consists in holding it in the cavity in such position that the shank of the stone represents exactly the line of direction that the pattern must draw. Without changing its axis, the revolving stone is moved around inside of the cavity until the latter has the same taper that the stone has.

During recent years there has been a tendency toward a more or less angular form of cavity preparation for all gold work. This general method of cavity preparation is not conducive to best results from inlay work. Sharp angles at the cervico-buccal and lingual aspects of an approximo-occlusal cavity have no point of merit whatever in an inlay operation, and serve only to weaken the tooth as a whole. Therefore, instead of cutting angles, we prefer leaving these places more or less rounded. An inlay must be "rocked," as it were, into position, in order that the surplus cement may more readily get out of the way. This movement of the inlay becomes more difficult in proportion to the more angular form of the cavity. Instead of a perfectly flat

base we cut in angular cavities a slight oval depression safely within the cavity margin. This provides a locating medium for that part of the inlay when it is placed into the cement. A flat base may provide a means for the imprisoned cement to force the cervical portion of the inlay outward as we attempt to cement it into place. The oval depression mentioned will cause the inlay to glide exactly into position under pressure. This feature of the cavity should be very slight, and still it will do all that is required of it.

There should be no sharp angles whatever projecting inward in any part of an inlay cavity. Angles of this kind make weak places in the prepared mold, and abrasion of these weak places is likely to be occasioned by the gold moving against them in the casting process. Angles of any kind in the interior of a cavity add to the difficulty in forcing the surplus cement out by adding to the tortuosity of the course it must take. Should the interior of a cavity seem too extensive to warrant sufficient cutting away of enamel to allow the pattern to draw, it may be partly filled with cement, and the undercut thus filled in before making the pattern; or if for any reason it is desirable to reduce the amount of gold for a given case, this can best be accomplished by partly filling the cavity with cement before making the pattern. This is a far more definite method than cutting away part of the wax pattern to get the same result, because the pattern is likely to be distorted and have its margins injured by being handled in the cutting. Then, too, the hollow inlay thus

made has a tendency to be floated, as it were, by the mass of soft cement that must be placed under it, and the inlay is harder to set than if a mere line of cement were needed.

The marginal outline should be so located that no direct occlusion could occur on that line. This protects the enamel against the possibility of a chipped edge, and also the gold against a severe and continuous burnishing at one spot of the edge. This burnishing may in time break away a section of the enamel in very much the same way as continued burnishing of the gold under an incisor Richmond crown causes the facing to break at the pins. The only weak place in the exterior of an inlay is the line of union. Keep this as far from the probability of violence as possible. The marginal enamel angles should be more obtuse for gold inlays than for gold fillings, and still more so than for porcelain inlays. The margin of a gold inlay, being thoroughly homogeneous, is reliable even at an angle of sixty-five degrees. This secures for the enamel margin the remarkably strong angle of one hundred and fifteen degrees. Of course, different parts of the cavity may for logical reasons seem to require different angles. This entails a matter of judgment on the part of the operator.

It is impossible to treat all cavities in accordance with any given set of detailed rules, and while more or less details are given in this brief treatise, it must be borne in mind that the governing principles upon which these details are based must combine with a given practical case, in order to work out the peculiar details.

OBSTACLES TO BE OVERCOME IN ORDER TO SECURE SCHOOL INSTRUCTION IN ORAL HYGIENE.

By PAUL GARDINER WHITE, D.M.D., Boston, Mass.

(Read before the Northeastern Dental Association, at its annual meeting, Hartford, Conn., October 21, 1908.)

AS professional men it is our duty to obtain and disseminate accurate information that will be beneficial in promoting and improving the general public health, and to point out conditions that we consider dangerous to it. There is no better place than dental meetings for discussing ways and means of spreading enlightenment and education along this line. The first step of progress in this direction must come from us, and we must create and awaken an interest among our fellow citizens generally as to the importance of sound teeth for the healthy development of the child.

When one states that public health is essential to the welfare of the community, there is, of course, no dissenting voice. It cannot be that those who have authority to check the preventable waste of human life constantly going on around us have no realizing sense of what it signifies. The state does not do its duty in this matter, because, possibly, it does not know what its duty is. When officials are told that the death-rate can probably be lowered if adequate measures, which are well within the possibilities of realization, are inaugurated, the statement does not seem to make any definite impression on their minds. They have to be informed in detail as to how these proposed measures would accomplish the desired result, and if they were so informed, we cannot doubt for a moment that the appeal would be heard.

There are more than 20,000,000 school children in this country, representing one-fifth of the entire population, and there is hardly one child among them

that has no defective teeth, and among the other four-fifths of the population there is scarcely one man or woman who has never had occasion to employ a dentist. These same conditions prevail throughout the civilized world. Dental imperfection is a disease of civilization, and how to check the havoc which it is making upon human-kind is one of the serious problems of the day.

The presence of bacteria within or upon the human body, the transmission of disease germs from the sick to the sound, is but one of the many factors which tend to cause disease. A lowering of bodily resistance is the first step upon which disease finds its opportunity. The healthy body has the power to resist disease, and a body cannot be healthy with a foul and neglected mouth.

During the past few years, our dental journals have been filled with reports of the results of examinations of school children's teeth. Articles have appeared time and time again on the necessity of the care of the teeth. A few cities have reported the establishment of dental clinics and examinations, while comparatively little has been done in the way of educating the public, of forming associations, or of appropriating funds for state or national legislation on behalf of this great movement. A united and earnest effort on the part of our dental societies, augmented by the individual endeavors of the dentists themselves, should bring about a very general adoption of oral hygiene in the public schools, and no one can give fuller information or more assistance in promoting better care

of the teeth, in educating the public up to a desire for dental inspection, than the dental profession. If our profession, its schools and its organizations, would go on record as a working body engaged in a well-organized movement for checking and controlling tuberculosis, it would earn the highest praise in this country.

If there is any country in the world where such conditions should not have been permitted to exist so long without being detected, it is our country, where state laws declare that whatever else may be done with a child's time in school, he shall be taught hygiene and physiology. To these subjects alone the right of way is given for so many minutes a week, or so many pages a text-book, or so much of each lesson; for failing to teach this subject with the frequency prescribed by law, teachers may be arrested, fined, and removed from office. Yet in spite of these laws existing in every state and territory, and in spite of the army of publishers' agents ready at a moment's notice to jump to the defense of these laws, physical defects and unhygienic living are quite as common here as in the countries where opposition to alcohol and tobacco is not strong enough to influence legislation. There are as many people today digging their graves with their teeth as there are persons drowning their souls in alcohol; they eat too fast and do not masticate their food thoroughly. The chief purpose of school hygiene has hitherto been, not to promote personal or communal health, but to lessen the use of alcohol and tobacco, and there is not a single physiology or hygiene book used in the public schools today that contains a chapter on oral hygiene, which should be the longest and most important in the whole book.

We have medical inspection in our public schools—why not dental inspection? Is it that the United States are far behind other countries where dental school clinics have been established, or is it that there is too much jealousy between the physician and the dentist and too little co-operation? Section 5 of the Massachusetts Medical Inspection law reads:

SECTION 5. The school committee of every city and town shall cause every child in the public schools to be separately and carefully tested and examined at least once in every school year to ascertain whether he is suffering from defective sight or hearing or from *any other disability or defect* tending to prevent his receiving the full benefit of his school work, or requiring a modification of the school work in order to prevent injury to the child or to secure the best educational results. The tests of sight and hearing shall be made by teachers. The committee shall cause notice of any defect or disability requiring treatment to be sent to the parent or guardian of the child, and shall require a physical record of each child to be kept in such form as the State Board of Education shall prescribe.

Defective sight and hearing receive special attention in this law, and if teeth were at all considered by the men who drafted the bill, they must surely come under the words "any other disability or defect." Are not the teeth of more importance to the general health than either the eyes or ears? The eyes and ears only affect the individual student, but one single unclean mouth vitiates the whole atmosphere of the schoolroom and becomes a fruitful source of disease. It certainly does not look as though the medical men who drew up that bill were eager for co-operation. Horace Fletcher once said, "Perfect health is mental and dental." Let us prove to the people that dental inspection and instruction in oral hygiene is far more important than medical inspection, as medical inspection deals more with the prevention of the spread of disease and its cure than with the prevention of the disease itself.

This is a matter in which we hope that not only the members of our organizations, but every village improvement society, grange, and women's club will be interested. It is a specially appropriate subject for women to take hold of, inasmuch as the whole effectiveness of the movement will depend upon the degree of interest taken in it by the mothers of the children.

It was because of the ineffectiveness of the medical inspection laws, as applied to the teeth, that I took the matter of

oral hygiene before the Boston school board and the Boston Schoolmasters' Association in November 1907, through the influence of John F. Fitzgerald, then mayor of Boston.

My paper on "The Necessity of School Instruction in Dental Hygiene," read in the presence of some 300 schoolmasters, and published in the *DENTAL COSMOS* for January 1908, was received with considerable enthusiasm, and the masters made many requests for lectures on the care of the mouth and teeth in the schools of Boston, which proved a great success. Another paper published in the April *COSMOS*, entitled "More About School Instruction in Oral Hygiene," and widely distributed among schoolmasters, added greatly to the interest already shown. This was followed by a petition to the school board asking for the establishment of a course in oral hygiene in the schools. This petition was referred by the school board to the board of superintendents for consideration and report, and at a meeting of the school committee on February 20, 1908, it was reported as follows:

The board heartily appreciates the desirability of inculcating habits of dental cleanliness among school children, and that much attention is given to the subject by many teachers. The board of superintendents believes that this is a matter which should properly engage the attention of the department of physical training and athletics, and recommends that it be referred to that department to consider means and methods for making instruction along these lines more effective.

The communication in which this report was embodied was placed on file, and the recommendations of the board of superintendents were adopted by the school committee.

From the department of physical training and athletics, in whose hands the matter now lies, the movement received its first serious check, and it is in view of these obstacles that this paper is partly written.

The statement is being made, and also contradicted, that there is jealousy and little co-operation between physicians and

dentists. Whether these statements are right or wrong is a question, but, in my experience I have found little co-operation and much jealousy, and when a physician, holding the responsible position of director of hygiene in the large city of Boston, is of the opinion that dental examinations can be made just as effectively by the medical inspectors already in the service of the public schools, it adds, I think, weight to my findings.

If the work is worth doing at all, it is surely worth doing well, and we might just as well ask, "Why cannot medical inspection be performed by dentists?" To the suggestion that the teachers and nurses undertake this instruction and inspection, let us answer that these people, instructed by all sorts of dentists, who have no experience and no real appreciation of the importance of the work, are wholly unfitted, and that only a man trained in oral hygiene is competent for this work.

It seems to be the opinion of the department of physical training and athletics, as well as that of our great universities, that the body must be developed as well as the mind, and vast sums are spent for athletics, playgrounds, gymnasiums, stadiums, etc., and it is a question to many whether this money is spent wisely or not. Perhaps, if great universities and school systems devoted some of their energy and money to teaching the science of right living and the doctrines of the great Horace Fletcher, more could be accomplished for the physical development of man in that way than by all the stadiums and athletic boards in the country. It is not meant by this statement that the latter are not needed and enjoyed, but that physical perfection for the masses is not obtained in them.

Perhaps it may be interesting to state that although the public is deeply impressed by the need of medical inspection and is already praising its good work, over twenty of the medical inspectors themselves stated, when interviewed in regard to the petition spoken of, that medical inspection as conducted today is simply a farce.

It may also prove interesting to know that jealousy is not confined mainly to differences of the medical and dental professions, but exists to a very marked degree between the dentists themselves. This was evidenced more strongly than ever by some dentists refusing to sign the petition, and asking, "What are you trying to get out of it?" or "Your theories are all right, but not for me, I am not going to ruin my business." This jealousy did not stop here, however, but continued and increased, until a feeling of jealousy sprang up or became more evident between the colleges. Many refusals came in the form of an answer similar to this: "It is a very good idea and surely ought to go through, but as you are not a member of our college. . ." or, "As my college is doing work along this line, I cannot sign your petition." I believe in loyalty to one's alma mater, its interests and advancement, but our first consideration should be given to the profession of which we are a part. Just so long as this petty feeling of jealousy exists, and just so long as our profession is divided, just so long will our advancement and our interests and the welfare of humanity progress slowly, but if we are once united, working for each other's interests and for a worthy cause, success is ours. It will come, perhaps, slowly at first, but as the truth dawns upon us, maybe every board of health will have its dental member, every hospital, prison, and reformatory its dental department, and every school its department of and instruction in oral hygiene, the dental surgeon be established in the army and navy, and, better still, the mortality rate be decreased over fifty per cent.

It has been said that our motives are mercenary, that we want the people for patients, and that such a thing as dental inspection means advertising for the dentist. These suspicions only prove that those who make such statements are absolutely incapable of comprehending the importance of such researches. Of course, the cost has to be considered, and I quote from a card hung in the Dental Hygiene Council exhibition which reads as follows: "School dental clinics which pro-

tect the main portals of the school children's bodies, the mouths, will cost little more than the school mats which protect the schoolhouses at their portals." The community counts carefully the cost of the school inspector, but it does not count the cost of death and disease, of wrecked hopes and of families dependent on public charity. It is never as expensive to a community to do the wise and right thing as it is to leave it undone.

As dental surgeons, we are convinced that the money invested in providing healthy mouths in the rising generation, and in instilling in the public mind the principles of personal dental hygiene, will be saved tenfold in money now invested annually in general hospitals and in other sanitary institutions where the diseases treated are in a large proportion of cases directly traceable to the nervous and other disorders resulting from defective dentures, and that dental treatment administered in early life prevents more diseases in after life than any other measure taken by governments, not even excepting vaccination. Just as vaccination had to be forced upon an ignorant public, so we shall have to force upon it methods of prophylaxis. The introduction of vaccination caused much animosity, all sorts of evils were attributed to it, but today its truly immense value is generally recognized. The careful cleaning of the teeth and gums causes much soreness, but patients are glad to acknowledge the benefits received in the end. It is just so with the public; it is hard to make them realize the importance of this work, and it rests with such assemblages as this to enforce that knowledge.

We are told that the school courses are already crowded, and there seems no room for oral hygiene. If this is so, then something of less importance should be eliminated. A part of the time given to supplementary reading might be utilized to advantage. Perhaps if the Boston school board would pay out the money that is now spent for instruction in the Gaelic language in the establishment of a course in oral hygiene it would be less liable to criticism than it is at

present. The wisdom of making whatever sacrifice is necessary to introduce lessons on the care of the teeth is too evident to need further discussion.

Some advocate dental inspection and some a course in oral hygiene, while I believe that both should be established. In the model dwellings built for the indigent poor of London, a tour of inspection six weeks after the tenants moved in revealed that the porcelain bath-tubs were used as coal hods, that the plumbing was stopped up with refuse, etc. It is the same with the teeth. To put a child's mouth in prime condition, if the child has no habits of dental cleanliness, would be ill-advised charity, and before we can help this class of patients they must be taught their duty to themselves. This, then, means a course in oral hygiene by means of text-books or lectures. As there is at present no suitable text-book on oral hygiene, it seems best to install a course of lectures conducted after the manner of musical instruction, the lecturers to be paid by the school authorities. The want of a suitable text-book, however, makes us rather timid about approaching school authorities, and it seems to me that this can only be rectified by appointing a council or committee to confer with the authors of the various text-books on physiology and hygiene used in the schools, and by submitting a chapter on oral hygiene which, printed in all new editions, would supply this long-felt want. Then we should be assured of our children learning this subject as well as their other lessons.

That the public press, the disseminator of daily occurrences, is a powerful agent for the public good is beyond question. The review of my paper, for instance, published in the *Literary Digest* of July 4, brought forth over one thousand requests for copies from all over the United States and Canada. What all our societies for the advancement of this movement need, are committees on newspaper and magazine publicity, who should from time to time recommend methods for popularizing information on oral hygiene, and should, wherever practicable, publish monographs and bro-

chures on this subject. A committee on research should make and direct investigations into special subjects or conditions, whenever accurate information becomes necessary in connection with this work. A committee on co-operation might co-operate with as many of the other organizations as are engaged in the work of human betterment. A legislative committee, who will really work, should watch the progress of all proposed federal or other legislation, opposing such legislation as may be detrimental to the public health and working for the passage of new laws to protect this work and to seek adequate appropriations for expanding it. A committee on finance and political indorsement should obtain the support of political parties, and should use all legitimate methods of accomplishing adequate legislation. Any laws enacted must be enforced, but they never will be enforced until public opinion is educated to the point of demanding such enforcement, and until skilled specialists devote their entire time to it.

Is it not true that the health of the people is of as much importance as the health of animals? Consider the millions of dollars which the national government spends every year for the health of animals. If these millions were spent in studying and preserving the health of human beings, we should not stand where we do now, a byword for the nations of the earth because of our ignorance and indifference in these vital matters. The four great unnecessary wastes of today are preventable death, preventable sickness, preventable conditions of low physical and mental efficiency, and preventable ignorance, and it is a more than suicidal policy for a nation to permit such great wastes to go unchecked; for an evil more destructive than race suicide is race homicide.

With a better understanding between us and the public let us work in unison for the betterment of the race, physically, mentally, and morally. Many will fail to appreciate work of this kind, and will place obstacles in the way of its progress. Our duty, however, is to aid in the advancement of dental knowledge, and to

render such knowledge useful as the contribution of public-spirited citizens to the welfare of the community. Dental sanitation is a great unexploited field that

will surely yield rich social dividends in the next few years. Upon our efforts and their success will depend the adoption of this form of public education.

THE PROBABLE USEFULNESS OF THE SILICATE CEMENTS.

By WM. B. DUNNING, D.D.S., New York, N. Y.

(Read before the New York Odontological Society, at its regular monthly meeting, November 17, 1908.)

IT is the purpose of this paper to develop a discussion on the merits and the shortcomings of the new silicate cements. The writer can speak only from an experience of two or three years in the use of this new filling material, which experience unfortunately nearly covers the length of time that this material has been available in dental practice. No one is yet prepared to speak in an authoritative way of its practical value as a tooth-saver, since it has not yet stood the test of time; but we all, perhaps, have been so impressed with its probable good qualities as to feel that a comparison of notes should be made, as a point of departure for further observations.

It is to be regretted that the manufacturers of the principal silicate cements have adhered to the ancient trade custom of keeping secret the exact formulæ of their preparations, regardless of the fact that the patent records are open to the public and that their preparations may be analyzed. No purpose of protection is in this way served against individuals who may be bent upon infringement, while the conscientious operator, from lack of time or knowledge of facilities, fails to satisfy his very proper desire to know the nature of what he is using. In consequence of this shortsighted policy, many would-be consumers have hesitated to freely use these preparations.

In reply to a letter to the L. D. Caulk

Company requesting information concerning their preparation Translux, I have received the following, which without referring specifically to their own product, is interesting and valuable as dealing with the subject at large:

Your letter of inquiry in regard to silicate cements was received several days ago, but owing to a rush of business and the technical nature of the answer required, it has been unavoidably delayed. We trust the following will cover the points that you have in mind.

The powder as applied in dentistry consists of compound silicates of lime and alumina, with aluminates, modified by addition of other basic silicates which the manufacturers may determine advantageous in production of desired modifying effects.

The liquid is a solution of orthophosphoric acid, containing aluminum phosphate and ingredients used to control rapidity of action upon the powder.

Mixing the powder with the acid solution a chemical reaction is produced, during which any particles of oxid present are seized upon by the acid and converted into insoluble phosphates, leaving the silicates in a hydrated condition, and binding the mass into a dense body, or artificial stone, flint-like in its properties.

After the time allowed for complete chemical combination—or "setting"—this material will indefinitely remain hard in a dry state, and in a wet state resists action of most solvents, excepting *strong* acids or alkalis.

Possessing these properties, and showing but slight expansion or contraction under normal conditions, viz, in moist state, it natur-

ally follows that in the mouth it possesses lasting qualities, particularly as it is capable of high polish, this further enhancing its resistance to the action of solvents.

All silicate cements have virtually been based upon similar materials, and reasons for failure are so numerous and varied as to defy classification.

A few principal causes are given:

Lack of accuracy on the part of the manufacturer in calculating percentages of ingredients to form a product in which the chemical bonds were properly satisfied. Result: Excess of one or more materials, which entering uncombined into the plastic mass necessarily introduced an element of weakness, interfered with the correct action of acid solution of a given strength, and resulted in the presence of free soluble matter or material in such shape that, lacking affinity or combination with other bases, it could be washed out or would break away.

The use of too much flux in the effort to reduce raw materials at low temperatures, resulting in the introduction of free soluble matter; the lack of knowledge regarding degrees of heat and length of time required to obtain desired results, and failure to recognize the absolute necessity for careful tests to demonstrate absence of error during every step in the process of manufacture.

On the part of the profession, lack of proper manipulation, not recognizing the fact that the silicate cements cannot be handled successfully without special preparation of the cavity as for gold or amalgam; or, in other words, that these cements cannot be used with the same indifference to detail as are the oxyphosphate cements, as none of the silicates after having become hard retain the adhesiveness of an oxyphosphate, but rather depend upon the shape of the cavity to hold them in position.

The powder of an oxyphosphate, if properly prepared, is composed essentially of true oxids, which upon combining with phosphoric acid are converted into oxyphosphates.

The powder of a silicate cement is composed—(theoretically)—entirely of silicates or their combinations, though there may be traces of oxids, or, upon exposure, hydrates or carbonates, but only in the most minute quantities.

Silicates, as the name indicates, are compounds of silica with various elements or bases. Under favorable conditions, silica acts as an acid, and at high temperature effects many combinations. While there are exceptions in which it enters into volatile conditions, as a rule we obtain vitreous masses—

such natural products as rock crystal, various spars, and many of the semi-precious stones, and artificially, glass, porcelain, etc.

These combinations, as a rule, are practically insoluble substances, which yield only under favorable conditions to the action of strong acids or alkalies, and then only through special treatment.

The chemical action of silica is so complex, it being analogous to carbon in this respect, that while a general knowledge of its actions is held, there are yet many fine points for chemical research. Artificial silicates, after grinding and exposure, might, as stated, contain trace of oxids with which the phosphoric acid would combine, but not sufficient to do more than aid ever so slightly in the binding, and it could not by any stretch of the imagination be considered as an "oxyphosphate cement."

It is more than likely that the gelatinizing of the finely divided silicates through action of the acid is responsible for the direct cementation, or, in other words, the freeing and re-arrangement of silicic acid; they may therefore be called true silicate cements.

In silicates, if properly prepared, even after the powder has been converted into a cement through action of the liquid, any trace of phosphates present would be of an insoluble character.

Tests on slabs of silicate cements in four per cent. solutions of hydrogen sulfid or ammonium sulfid, and allowed to remain two weeks, or until the solution had been decomposed and the free sulfur deposited, have failed to show any marked discoloration, and such tests are surely more severe in this regard than could possibly occur in the oral cavity.

Sulfuretted conditions exist in secretions of all mouths to a greater or less degree, and it is logical to conclude that if this were the cause for discoloration such fault would be general, and not confined to isolated cases, as is the fact. In light of the knowledge presented it would seem we must look farther for the *one* fault—discoloration.

Granting the good points which silicates *do* possess, it is surely to the advantage of the profession to give them an unbiased trial and not jump to unfavorable conclusions without direct and convincing evidence.

I am indebted to Mr. Pinches of this city, representing Ascher's Artificial Enamel, for much information, short of the precise formula, concerning the nature of his preparation. As this com-

pound was the first practicable silicate cement to be put into our hands, and as my brief experience has been derived almost entirely from its use, I shall speak of it as a type, though in no way discriminating against the dozen or more other preparations now on the market, nor inferring in any way that Ascher's is, or is not, the best material of this kind for our purpose.

The inventor, the German chemist Steenbock, in his "Specification forming part of letters patent No. 771,184, dated September 27, 1904," speaks as follows regarding the nature of this material:

My invention relates to a process of manufacturing vitreous cement which substantially consists in mixing phosphoric acids or their acid salts in solution with beryllium compounds decomposable by or reacting with the same. The product thus obtained, which possesses excellent cementing qualities and is particularly suitable for plugging teeth, exhibits an extremely high transparency, this being quite a new feature with cements produced by the cold method. Translucent cements have already been obtained by a melting process, but this process is too inconvenient and difficult to be employed, for instance, in the case of pluggings for teeth, besides being very expensive and frequently attended by failure.

The material produced by my aforesaid process in a convenient manner is quite vitreous, slightly opalescent, and has an exceedingly delicate bluish-white tint, by reason of which it is especially adapted to be used for plugging delicately translucent teeth, as a cement for pearls, fine porcelain, and the like. In addition to the aforesaid high transparency, which is a new property in cements of the kind, and the deep luster due to such property, the cement manufactured by my process constitutes a new chemical compound differing materially from all cements of a cognate character. In contradistinction to the other cements, which are formed chiefly of zinc, calcium, and magnesium phosphates, this cement consists almost exclusively of pure beryllium compounds.

I am aware that cements are used to the acids of which beryllium oxid has been added, but this addition is only designed for delaying the hardening, and may in this function be replaced by magnesium oxid. It has no determining influence upon the composition of the hardened cement, which does not differ

from that of other cements. The quantity added is so slight that the cement produced does not by any means consist of beryllium compounds, such as is the case with the cement made by my process.

A convenient mode of carrying this process into effect is as follows: A deposit formed by precipitating a solution of basic beryllium nitrate. $\text{Be}(\text{NO}_3)_2 \cdot 2\text{BeO}$, with sodium silicate, Na_2SiO_3 , after it has remained for some length of time under water, is filtered, carefully washed, dried, and slightly calcined. The preparation obtained—the empiric formula of which is 3BeOSiO_2 —is finely ground and used by itself, or, if greater consistence be required, is intimately mixed with glass or pure clay. The powder is carefully triturated with an approximately 52 per cent. orthophosphoric acid in which aluminum phosphate containing a little zinc phosphate or strontium phosphate is dissolved almost to saturation. In this manner a plastic material is obtained which in a short time sets to form a cement exhibiting the properties hereinbefore set forth. It is supposed that in the hardening the acid liquid withdraws beryllium oxid from the basic beryllium silicate, leaving a hydrated silicate behind and forming phosphate.

From this technical description it is to be gathered that the liquid consists of a nearly saturated solution of aluminum, zinc, and strontium phosphates in 52 per cent. orthophosphoric acid, and that the powder consists of the combination of beryllium nitrate with sodium silicate. These two elements are supplied for our use, and their combination, through proper mixing, produces the elaborate compound to be discussed. Ascher's enamel bases its claim to permanence on the insolubility of beryllium in the fluids of the mouth, this mineral comprising 24 per cent. of the powder.

It will be seen that the name "chemical" or "plastic" porcelain has very fitly been used to describe the nature of the silicate cement. A filling of the same contains many of the constituents of fused porcelains, but the compound has been made at ordinary temperature by the union of a powder and a liquid, instead of, as in the case of true porcelain, the union of base and flux at a high temperature. We are cautioned by the manufacturers that this "chemical porce-

lain" can never equal fused porcelain in strength and durability.

The physical characteristics of silicate cement, when set, resemble those of porcelain. The same degree of translucency is not obtained and the cement does not retain the glaze beyond a certain length of time. My observations are based principally upon my own fillings, inserted during the past three years, and some allowance upon these points should probably be made for error in manipulation. Further than the loss of the glaze, I have not seen evidences of wasting by solution.

FIELD OF USEFULNESS.

The silicate cement seems especially adapted to the many small cavities in the incisor and bicuspid regions where metal would be unsightly, and where the retention of minute porcelain inlays would be uncertain. These labial, buccal, or approximal cavities are not exposed to stress of wear, but subject to the chemical influence of mucous secretions and other fluids of the mouth. An insoluble plastic porcelain in the region named, even though lacking somewhat in edge strength, but possessing the other qualities of porcelain, seems almost ideally suited for our purpose. Many of the minute approximal cavities, where much cutting would be necessary for inlays, may be perfectly filled with this substance at a minimum loss of sound tooth-structure, and aside from this consideration, the patient will be saved much of the fatigue and pain of the larger operation. It is also a great advantage not to be hampered with the usual film of opaque cement, which with the inlay interferes with the transmission of light, and by gradual solution, leaves the porcelain edges more or less unsupported and liable to chip.

It has been my practice heretofore to confine the use of this material to the small cavities mentioned, partly because I doubted its ability to withstand a crushing stress, and partly because in a large cavity in which a well-constructed porcelain inlay may be used, it is possible with the inlay to secure the nice blending of

shades necessary at different parts of the tooth. In talking recently with many excellent operators, I find that they have not hesitated to fill large compound cavities and restore contours which have successfully withstood the stress of mastication. The possibility of so using the silicate cement for almost all purposes of restoration in cavities of decay is too new and too broad a field for me to consider here.

CAVITY PREPARATION.

Cavities should be prepared with all the care used for the insertion of gold, but with a slight modification in form. While the cement has some adhesive quality, it is well always to depend only on a retentive shape, hence the usual undercuts, though rather shallow ones, should be made. The enamel margins should be beveled as little as possible consistent with the proper protection of the enamel rods. The nearer the cavity walls approach the perpendicular to the bottom of the cavity the better, as a feather-edge of cement must always be weak and liable to chip. In a deep-seated cavity where there is danger of injuring the pulp by the pressure necessary to insert this filling, a rigid floor should be made to cover the pulpal wall by flowing over it a good oxyphosphate, the dentin having been first rendered sterile and put in safe condition. While an exposed, or nearly exposed pulp may be strangulated under the pressure of packing the filling, I have seen no case, nor heard of an instance, in which there was evidence of chemical irritation caused by the contact of the filling with the dentin.

When the cavity has been perfected, it should be finally cleansed and dried with alcohol. Absolute dryness of the parts near the filling must then be maintained for at least twenty, preferably thirty minutes, and the application of the rubber dam is advised in all cases.

MANIPULATION.

The proper shade should of course be determined while the tooth is wet, by means of the shade guide, or trial mixes

formed into points. The powder or powders to be blended are selected and placed on an agate slab, beside the proper amount of liquid. With an agate or bone spatula carry to the liquid a mass of the powder of about equal bulk. Mix with a light rapid motion, then add small quantities of the remaining powder—being sure that a given quantity is incorporated before taking the next—and continue this deft but thorough mixing in the most expeditious manner, not spreading it over a wide surface nor wasting time in scraping the slab. As the mix becomes thicker and finally tough and stiff, some pressure and a kind of patting motion is needed to work the mass into a uniform consistence in which no dry particles of powder remain. The average mix should be a little softer than warm gutta-percha, and it should be carried in pellets and packed rapidly and accurately into all parts of the cavity, great care being taken to get perfect adaptation at the margins and to condense the entire surface of the filling while it is still soft. This can best be done by means of ivory or tortoise-shell burnishers, supplemented by celluloid strips and disks, all lightly greased with vaselin. Surplus material may be trimmed away with keen blades. The ideal result is the perfectly condensed and burnished filling, so nicely finished at the margins as to require no grinding or further shaping. But as it demands almost infinite skill and dispatch not to be caught by the setting, most fillings when set have to be trimmed and finished with disks and strips. In this way absolutely perfect margins may be obtained, and the high polish nearly restored by fine disks. After twenty-five minutes the filling should be quite hard, when all vaselin may be removed by alcohol, and hot paraffin or sandarac varnish spread over the filling and adjoining parts. If the filling is an approximal one, the dam may then be so stretched as to expose the rubber septum between the teeth; this is cut, and the dam removed.

A minimum amount of vaselin should be used on the instruments in finishing, and great care should be taken to prevent its being mixed into the filling, or getting

between the filling and the cavity margins. Of course all instruments used for packing must be absolutely clean and free from the slightest trace of grease.

Tortoise-shell points are now made for packing the cement, and are suited for large accessible cavities. I confess that I have encountered no bad results in using polished steel pluggers, though their use is tabooed by the manufacturers.

CONCLUSIONS.

It is still a common experience in daily practice, while examining the upper incisors of an elderly patient to happen unawares upon a cleverly concealed gold filling, smooth and dense and bright like an old coin, surrounded by perfect and highly polished cavity margins. Upon inquiry you are told that that was the work of some operator now famous in our history, and that there it has stood through the vicissitudes of fifty years. It would be idle to compare the broad usefulness of modern methods in dental practice with the primitive efforts of that early but determined workman, yet in this given instance it is impossible to escape the question, How will our finest fillings in fused or plastic porcelain compare with such work after they have stood the test of time? It is probable that no one as yet dares to be very sanguine in such a speculation. The inlay, however, or the silicate filling, which serves its purpose for ten years and is then easily renewed, while requiring constant watching, may give the patient in the course of a lifetime greater satisfaction than a poorly concealed or conspicuous gold filling. Most persons of refinement will prefer to guard a transient perfection rather than undergo, for the sake of permanence, a lasting disfigurement. These admirable specimens of ancient gold fillings are the occasional exceptions among the unsightly bulwarks of gold we now wish to eliminate, built by the same operators.

In comparison with porcelain, the writer doubts if, in cases of large restorations, silicates will ever give the same results in the blending of shades, and the

translucency possible in the use of the former. But with the plastic porcelain, small cavities may be easily, quickly,

surely, and invisibly filled, if the operator has mastered the delicate technique always demanded in its use.

IMMOBILIZING AS A CURE FOR PYORRHEA ALVEOLARIS.

By J. FRANK HOUSTON, D.D.S., Rio de Janeiro, Brazil.

SINCE the earliest dawn of history one of the great afflictions to which mankind who reach and pass middle age have become subject has been the loosening and dropping out of the dental organs; and their loss is such a detrimental one for health and comfort and such a blow to human vanity that perhaps no other ailment has caused more research for a panacea than this one.

It is a notable fact even at the present time, after almost a century of practical dentistry on a scientific basis, that when a certain stage of disease which causes this loosening of teeth is reached, the great majority of dental practitioners offer no hope of restoring these organs to usefulness, and leave the unhappy victims to the resource of an artificial denture, and this stage is reached in perhaps a small majority of cases even when there exists simply a degree of looseness which provokes soreness when the patient attempts ordinary mastication, with perhaps a suppurative condition about two or three teeth and a general recession and highly congested state of the gums. Cases of this degree are successfully treated palliatively by a considerable part of the profession, but generally with the information given to the patient that the disease will probably continue or will appear again later on, or that it is really incurable. The treatment by the average practitioner for the condition described consists of superficially removing the calcareous deposits, perhaps syringing out the pockets with hydrogen dioxid, the application of some germicidal and astringent disinfectant, and a recommen-

dation to the patient to use some special wash or tooth-powder and not to pass more than six months without a repetition of the operation. This consumes perhaps one hour and generally so little importance is given to it that the patient considers it scarcely worth while, and if he takes even moderately good care of the hygiene of the mouth he will probably pass a year or more before the accumulation of calculus is such as to require the service of the dentist. In the meantime the suppurative condition has extended to two or three other teeth, and as the superficial portions of the teeth and gums are fairly well treated and the soreness periodically diminished by applications of iodine, etc., no especial notice is taken of it, and merely a repetition of the "cleaning and polishing" is made. This is repeated year after year until the teeth are nearly all beginning to be loose and do not become firm again with the cleaning up and toning up of the gums. The dentist then tells the sad story of how they begin to drop out one by one, and offers his best consolation.

A more careful examination at first would have revealed a deep pocket on one or more of the faces of the root, around which existed the suppurative conditions; and if, while the tooth is still firm, a thorough removal of all calculus, sordes, and plaques of bacteria, and a smoothing of the faces of the roots were made, a complete cure would generally be effected; and if the patient were taught to thoroughly cleanse the mouth and keep the interstices clean and polished, recrudescence of the disease would not take

place. Unfortunately the majority of patients are not sufficiently careful, and recurrence even under the best treatment very frequently takes place, and later on the patient awakes to the serious fact that his teeth are on the verge of dropping out. He consults the dentist, who finds several teeth with no alveolar attachment—teeth that a simple twist with the fingers covered with a dry napkin would easily remove; he suggests this operation and artificial substitutes, and the patient sadly submits.

This substitute is a simple horror to quite a number and an agreeable experience to no one, I care not how perfect it may be.

Bridge work when most perfectly executed and compared with the most perfect plates is by far superior, but in the conditions described it is not believed advisable, or at least I have not been able to find any authority on record to that effect. Bridge work is generally believed to be applicable only upon very strong and healthy roots, and its application to teeth seriously loosened by pyorrhea alveolaris has not been recommended in any case that I have been able to find. It is true that the application of various kinds of splints to mechanically hold loosened teeth in position has been recommended, but as a means and as a positive necessity for the complete cure and restoration of the teeth to usefulness it at least has not been taught to the dental profession in our current literature.

The occurrence of these cases in the last stage is so deplorably frequent, and so many of our patients are ready and willing to make any sacrifice to retain their natural teeth, that I consider it of the utmost importance, and anything that promises a good result in this direction is worth consideration and practical experimentation, and, with this belief, I wish to present the results in a few practical cases covering a space of some eight years—having in 1900 executed a piece of work which is still a standing evidence of the value of a well-known surgical fact, *i.e.* that "Immobility is necessary to a renewal of bony tissue," as applicable to the cure of pyorrhea alveolaris.

I am convinced that a great majority of teeth that are abandoned as entirely hopeless may be retained a number of years if they are by mechanical means made completely immovable and the entire denuded surfaces, and the part not exposed but separated from the tissue is perfectly cleaned of all deposits and a proper treatment of the gum tissue is made. The manner of this procedure has been so much discussed and so many satisfactory treatments have been suggested that I will not burden my readers with a repetition of any one of them. Everyone knows that a broken bone will not unite except it be kept immovable, and if there has been a rupture of the surrounding tissue, favorable aseptic conditions are also necessary to renewal of the bony structure. The uniting of new alveolar tissue with the roots of the teeth requires just the same conditions—immobility and asepsis.

In the year 1900 a patient who had been a number of years in the hands of a colleague was referred to me. He was a man of about fifty-two years of age, of habits somewhat dissipated and irregular, and not in the best of health. A left central and bicuspid and molars and the right second bicuspid and two molars were missing from the upper arch. All the teeth were much denuded, and a very pronounced suppuration existed between the left lateral and canine, also considerable suppuration around the right canine, which was loose enough to be easily removed with the fingers, being only secured by a small attachment of gum tissue on the posterior upper third of the root, the gum tissue being separated from the mesial and labial faces of the root almost to the apex; the gums were sensitive and inflamed. (Fig. 1.) The patient was using, much to his disgust, a small plate, which was the cause of the consultation. As I was an enthusiast for bridge work, and as I felt that I could safely promise a bridge to last for perhaps five years, the patient concluded that it would justify his having one, so the work was undertaken. The right canine being so loose, I wished to extract it; the patient, however, positively refus-

ing to have any tooth extracted, I made a pivot for it and included it in the bridge, being extremely careful with the root treatment internally and externally, as well as with all the other roots. I set

use with the occluding teeth was made, and it promises still to give several years of good service. Without this bridge the patient would ere this time have lost all the remaining roots and have used vari-

FIG. 1.

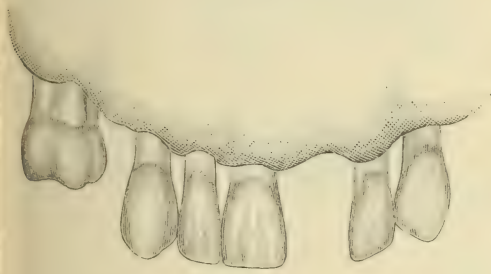
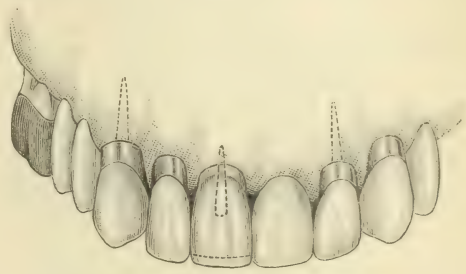


FIG. 2.



the bridge, making a solid arch of the upper remaining teeth. (Fig. 2.)

About a year afterward I saw the patient again, he having been absent for several months. I found the gums in splendid condition with no suppuration or irritation, and upon careful examination I was convinced that new alveoli had formed. I was not so positive of the firmness of the roots until last year

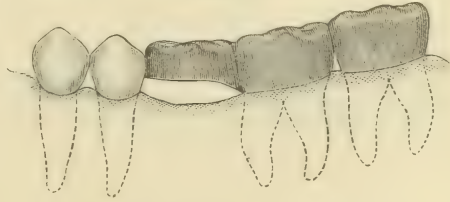
ous plates or modifications as the teeth would one by one have fallen out.

I have just now recalled to memory perhaps the first case that occurred in my practice of a re-formation of alveolar tissue through the application of bridge work. Thirteen years ago I made a general treatment of the mouth in the case of a man of about forty years of age, who had lost the lower left first molar.

FIG. 3.



FIG. 4.



a break in the bridge and some decay of two teeth which had been covered with gold bands, or rather open-faced gold crowns, rendered necessary a removal of the entire piece. I was delighted to find every root perfectly firm and much more solid than seven years previously. The upper right molar had in the meantime become entirely separated from the gum except the apical third of the palatal root, so it was cut away, with the exception of the small point of the palatal root. A new nine-tooth bridge on five anterior roots to give the utmost possible

The second and third molars were badly decayed and were poorly filled with amalgam, and presented a V-shaped space where fibers of food collected, and thus had brought about a highly irritated condition of the gum tissue, causing absorption of all the alveolar septum between the roots of the two molars. (See Fig. 3.) The two teeth were crowned and joined together at the union of the masticating surfaces and a dummy extended therefrom restoring the first molar. (Fig. 4.) In a short time the gum was in perfect condition and perfectly ad-

herent to the roots, and no trouble was experienced through the entrance of food into the interstice. I have not seen this case for five years, but I have reason to believe the work is still doing good service.

These cases of serious inconvenience on account of the collecting of food fi-

usefulness will be extended several years longer than would otherwise be the case. (Figs. 7 and 8.)

But to return to the type of cases most common; these are the lower incisors.

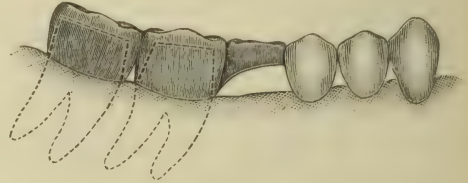
The first case I have on my record illustrative of the advantage of fixing teeth that are affected with pyorrhea occurred

FIG. 5.



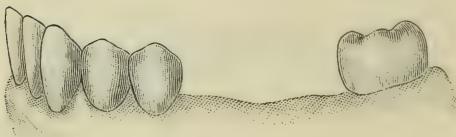
bers between the second and third lower molars are very common, and the condition is frequently aggravated by a tilting forward and lingually of the molars, in which the anterior one always moves the most, the position causing a thinning of the septum of the alveoli, and for this reason also renders it more susceptible to absorption. I have applied crowns with extensions restoring the space of the miss-

FIG. 6.



some eleven years ago. The patient, an English governess, had about as bad a case of general pyorrhea as I have ever seen; there was general suppuration and recession of the gums from all the teeth. A constant series of treatments had preserved them for several years, but at that time an accident with the fringe of a towel dislocated entirely the right central and seriously loosened the left, neces-

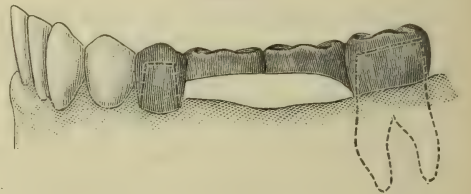
FIG. 7.



ing first molars, being particular to get a good firm contact with the second bicuspid, to quite a number of cases, and with very satisfactory results. (Figs. 5 and 6.)

Another type that is very common is that of a lower second or third molar standing alone, and owing to a lack of support invariably becoming in time loose and sensitive, and which if left alone will be lost much sooner than the group of the ten anterior teeth. If teeth in this condition, however, are securely fixed by a bridge to the second bicuspid, their

FIG. 8.



sitating its removal. The patient was so mortified that she would not appear before her pupils, and only two days later, when I had devitalized the two laterals and ligatured the natural tooth in place, would she again appear, having exacted a promise from me to tell none of her pupils or acquaintances of the misfortune. I stamped a close-fitting plate to the lingual surface of each lateral, and inserted through it a pivot anchored in the root-canal and firmly soldered it to the plate; a section of tooth was arranged as represented by Fig. 9, and the

missing centrals were suspended between these two plates, an idea of the finished

FIG. 9.



FIG. 10.



bridge being conveyed by Fig. 10. For several years I occasionally saw this piece, and noted that the progress of the pyorrhea was less rapid about the laterals than with the other teeth. The patient

FIG. 11.



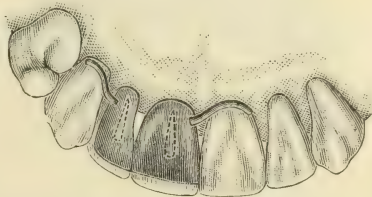
returned to England a few years ago, and I have no recent information in regard to the case.

A man of about fifty years of age, regular in his habits and of fairly good health, who attributed his pyorrhea to uric acid formation, presented with the upper left lateral elongated about three-sixteenths of an inch and considerably loosened, with the gum separated almost to the apex on the mesial side and half of the root exposed. (Fig. 11.) The left central was also somewhat denuded, elongated, and protruded. The case as it is at present is represented in Fig. 12, both teeth having been ground away considerably. After devitalizing, gold plates with pivots were applied to the lingual faces to secure them and to prevent any protrusion. An extension of half-rod platinum post-wire was soldered to the plates and extended partially around the lingual surfaces of the adjoining central and canine, all being solidly cemented

into place. The fixture has been in place more than four years, and the condition has not grown noticeably worse, although, as it is not fixed to the adjoining teeth, I have less faith in it; moreover, it was done partially as an experiment, the patient being willing to have it removed and replaced by a bridge as soon as it might become necessary.

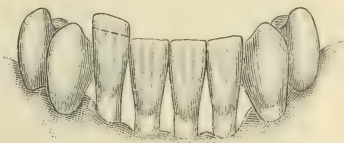
The same patient had the lower incisors very much affected and the right lateral began to protrude and was sore on account of striking the upper teeth. (Fig. 13.) I ground it away to the height of the others, devitalized the four incisors, made lingual plates with pivots, soldered all together, and cemented the piece into place. It was

FIG. 12.



placed in position more than three years ago, and the result is entirely satisfactory. There is a constant formation of calculus, which I remove at short intervals, but the gums, although much re-

FIG. 13.

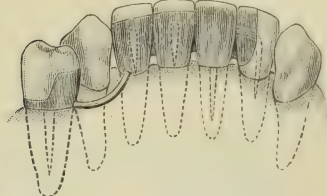


ceded, are close and firm around the necks of the teeth, thus preventing any penetration of the calculus formation.

Another patient was a French lady of over forty years of age, who had used for some years an upper denture. She had only eight lower teeth, with one of the

incisors, the right central, so badly decayed as to require a crown, and the right lateral also being badly decayed. All four incisors were very loose, the gums turgid and hypertrophied. The left central and lateral were devitalized, lingual plates with pivots were adjusted and joined firmly to the right central crown, which also had a platinum post anchored into the root-canal of the right lateral. As the canines were firm and the first left bicuspid required crowning, the incisors were joined to it by a half-round iridio-platinum wire adapted to the surface of the gums sufficiently distant from the neck of the canine. (Fig. 14.) This

FIG. 14.



gave perfect rigidity to the incisors, and in a very short time the gums were in a much improved condition. I made a lower plate, restoring the other seven missing bicuspid and molar teeth and articulating with the upper plate. A very marked improvement in the condition of the gums in this case is noticeable.

Another case very similar, for a lady of some fifty-eight years of age, having three incisors very loose, was arranged by splinting the four incisors after having devitalized them, and preparing the lingual plates with pivots, joining all together, and extending a small half-round platinum wire partially across the lingual face of each canine, thus preventing any anterior movement. A partial lower plate which was also necessary, resting against the lingual face of the incisors, prevented any posterior movement. I am confident the teeth will remain a few years longer, and a year has now elapsed since the patient had resolved to have them all extracted.

In a case of an interesting character,

which presented some four years ago, there was loosening of the six anterior teeth of the upper arch, which contained only two other teeth, a molar on each side, these being perfectly firm. The patient, a lady of perhaps forty-five, consulted me as to the cause of the loosening of this group of teeth. The anterior lower teeth were perfectly sound and firm, with scarcely any calcareous deposit; she had the ten anterior teeth present and one molar on the right side, which was tilted forward and lingually. I believed the cause of the looseness of the upper six to be the constant and abnormal pressure of the lower jaw against them and proposed a bridge for the lower right side extending from the two bicuspid to the tilted molar, so as to fix the position of the molar and restore it to a much firmer condition and improve conditions for masticating, as the upper molar occluded mostly over the space between the lower bicuspid and molar. The bridge was made, also a partial upper plate of three teeth on the left side and two on the right, and was used very satisfactorily until a few months ago, when I noticed that the upper group of six were much looser than I had previously observed, and a central incisor was ready to drop out within a few months. The patient was greatly distressed over this possibility, and I suggested devitalizing all the six anterior teeth, the molars having already been devitalized, and joining them by lingual caps with pivots in each tooth, bridging from this to the molars, thus dispensing with the plate. (Figs. 15 and 16.) The patient agreed to the operation and it was undertaken. Some three months have passed, and the condition of the gums around the teeth is almost as perfect as the lower ones, with no bleeding or sensitiveness, and the comfort of the mouth is very decidedly improved.

The most advanced case I have treated is that of a man of thirty-eight years of age, a magistrate, who has had a slight attack of diabetes of which he considers himself cured. His mouth as it now is (Fig. 17), after having been treated, will give an idea of how it was when the

gums were highly congested, with sup-
puration from deep pockets around

the treatment, and in order to drill into
the palatal faces of each of them for the

FIG. 15.

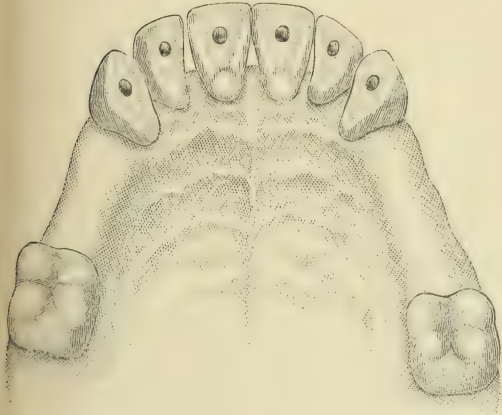


FIG. 16.



nearly all the remaining teeth. The case
presented with the upper right central,
all the left molars, and one right molar

purpose of devitalizing it was necessary
to secure them in position with an im-
pression of modeling compound on the

FIG. 17.



missing. The left upper incisor and can-
nine were ready to drop out, and it was
necessary to keep them ligatured during

labial surfaces, a small partial plate that
the patient was using serving to hold
them on the palatal side. The seven an-

terior teeth were devitalized, the lingual faces capped, and all joined together, restoring also the missing central. The patient considers that if he can escape even for five years the necessity of wearing a full plate by occasionally having an additional tooth put on his small partial denture he will be fully repaid.

This patient has all the lower teeth badly affected, but none of them so loose as the upper ones; they were kept ligatured with silk for several weeks, and are at present ligatured with a fine wire of soft alloy, and they are comparatively firm. The gums around the upper teeth are in splendid condition, but of course there is no hope that the gum tissue will ever return to the normal position or will even cover more of the roots than at present; yet even if a small portion of the alveolus be restored around the apex of each root they may remain several years in position. A constant hygienic care of the mouth is particularly necessary in a case so far advanced as this one.

A case at present under treatment has been an interesting one. Some five years ago this patient, a man of about forty-five years, consulted me. His mouth was in a very advanced stage of pyorrhea, several of the upper palatal roots having at that time small abscesses. The deposits of salivary and sanguinary calculus, which had not been removed for five years, had penetrated in many points almost to the apices of the roots, had deposited in the bifurcations of the molars, etc. The gums bled at any touch or pressure at almost any point in the mouth, and were so sensitive that it was necessary to locally anesthetize by injections around the roots in order to be able to thoroughly remove the calculus. The cementum of the roots in many places was so sensitive that cauterization with formol in visible places, and silver nitrate in positions not visible, was resorted to, and altogether a series of sittings of ten hours' duration was necessary to put the mouth in proper condi-

tion. An occasional hour, since, has kept the gums and teeth in fairly good condition, but on account of the space in the lower arch the upper bicuspid became elongated and extruded; and on account of the expulsive tendency from the gums, which is frequently a symptom in pyorrhea alveolaris, the upper centrals and lower centrals and a lateral have elongated and protruded considerably.

Within the past few months this condition has become aggravated, and I am undertaking to retard the advance in the following manner: The upper right bicuspid is to be cut off and crowned, the centrals devitalized and retracted to as near their normal position as possible, the same treatment also being necessary with lower incisors, on account of the occlusion being close. The retraction of the upper centrals I hope to accomplish by daily tightly ligaturing the six anterior teeth, which brings considerable pressure on the centrals. In four days half the necessary movement has been accomplished. The bicuspid will be united, also the centrals united by the lingual plates with pivots and joined to the bicuspid by means of a small half-round iridio-platinum bar adapted to the surface of the palate. This will prevent the protrusion of the centrals. The lower arch will be arranged almost identically, the right molar being crowned, the two missing bicuspid joined to it with a small fork extension around the canine and joined by the small platinum bar to three of the lower incisors, which are to be devitalized and provided with plates on their lingual surfaces, the incisors to be previously aligned and drawn back to their normal position.

In this manner I am confident of retaining the number of teeth affected by the "elongative gingivitis" for a few years, thus saving the patient the ordeal of passing these years with the teeth constantly more and more protruding until their removal or final falling out.

THE RELATIONS OF PHYSIOLOGY TO DENTISTRY.

By CARL J. WIGGERS, M.D., Ann Arbor, Mich.

(Opening lecture in physiology before the junior class of the department of dentistry,
University of Michigan.)

ON entering upon a new subject, a feeling akin to curiosity naturally prevails, not only as to its intrinsic worth as a subject, but also as to its relation to the practical part of the vocation one has chosen. Indeed, when a student enters a professional school, as of dentistry, he has a right to assume that each course in his curriculum shall serve as a step to the attainment of his future profession. The manner in which certain courses aid in reaching this goal is plain. In what way others, given equal prominence in the curriculum, assist is not always apparent. In my relation with students, I believe I have observed that the inherent interest in a subject is in direct ratio to its nearness to the end in view. For this reason, I desire to bring out the close relationship existing between physiology and dentistry.

In the first place, modern dentistry largely owes its rise and existence to the general dissemination of physiological principles. Before the public had learned by physiological teachings that the teeth serve more than an ornamental purpose, it was rare for anyone to consult a dentist unless excessive pain were present. In that case, relief was usually afforded by extracting the offending tooth. This act required only a mechanical workman, and for this reason dental work was formerly attended to by the barber. In his estimation the extraction of a tooth or the shearing of a head were equal tasks, requiring an equal amount of intellectual ability. As physiological teaching became more and more disseminated, however, there arose a demand, not only for men who were able to ex-

tract teeth, but also for those who could judge as to the feasibility of such treatment. So it happened that dental work became divorced from the barber's trade and a separate profession of dentistry was created. Even after this, repair of the teeth was for some time regarded as an ornamental operation only, on a par with face massage or the application of rouge to the cheek—very nice if one could afford it, but a luxury, not a necessity. Twenty years ago a certain town in Iowa boasted of three dentists. Today it contains at least two hundred, each one busier than any of the former three. The three worked at a time when any dental operation, aside from the killing of a nerve or the extracting of a tooth itself, was regarded as an ornamental luxury. The two hundred dentists draw their patronage from a community enlightened by physiological principles. Among them the desire to preserve their teeth is no longer prompted by a sense of vanity, but by the knowledge that good teeth are necessary to the maintainance of perfect health. Stimulated by physiological teachings, the young man or woman to-day makes regular visits to the dentist to have the teeth attended to before a large cavity has resulted. The young mother, recalling her school-day teaching, now consults the dentist for her infant's first set of teeth, knowing that they ought not to be neglected, even though another set will take their place. The aged sire or matron undergoes the pain of having a new set of teeth installed, knowing that good digestion may prolong or make more enjoyable the last remaining years of life. So it has come

about that the education of the masses in regard to physiological truths has gradually created the profession of modern dentistry, and by changing the motive for consulting them has produced a demand for more and better dentists.

The time has come for the dentist to realize the service physiology has done for his profession. He must recognize that in physiology dentistry today has its strongest advocate, and that he himself must be an agent for the further dissemination of physiological principles among the multitudes. This he cannot do, however, unless he is well versed in physiological learning, for he makes but a poor teacher whose stage of knowledge is not advanced beyond that of those he wishes to instruct.

In the second place, every profession the aim of which is the alleviation or amelioration of pain and suffering can accomplish its ends only through the application of principles gleaned from the elementary sciences. Without these sciences, dentistry would resemble so many "pathies" and "isms," "sects" and "cults," which form and thrive for a short time, then, as they try to enlarge, topple over because their pyramid was constructed with the small end as a foundation. But medicine and dentistry build out of the elementary sciences of physics, chemistry, anatomy, and physiology, bases so broad that additions may rest securely. I would ask you, students, not to look with less admiration on the skyscraper built of practical knowledge; but not to forget that it rests upon a firm foundation of elementary sciences, which, though perhaps unseen, is no less important than the superstructure.

There are even more practical relations between physiology and dentistry, however. It is due to physiological research that the teeth have been given more than a local importance. Not many years ago physiology busied itself with the effect of secretions on foods. The digestive action of saliva, gastric juice, and intestinal secretions was carefully worked out in test tube experiments. By these studies it was found that large

masses of food could be digested perfectly without any mechanical subdivision. It was further determined that the action of saliva was rendered inert as soon as it came in contact with acid, and as the stomach is naturally acid in reaction, it was taught that saturation of the food with saliva by chewing was a useless process. The saliva was looked on as an evolutionary relic, of no use except for the moistening of the food. It was the time when the physiologist prophesied the day of toothless man carrying a condensed food pill in his pocket for a dinner. All of this was of extremely bad omen for the dentist. Experimental evidence has, however, since been brought out to give a different forecast. The lesson has been learned that body digestion cannot be studied in a test tube, for it involves a mechanical as well as a chemical side. Chemical digestion of food would not take place to a normal extent if it were not for the mechanical manipulation that food undergoes, for the time of exposure to the digestive juices is too short to allow complete digestion unless this occurs. This is true because larger lumps stimulate the alimentary tract to more vigorous peristalsis, but act less efficiently as a stimulus to digestive juices. The result has been that dentistry has become more than ever a study of the teeth in relation to the rest of the body.

A knowledge of physiology is necessary to the interpretation of clinical dental problems. Let me indicate the relation by a few brief examples.

There is a class of patients in whom there is defective development of the teeth. There is some evidence that the thyroid gland has a relation to such disturbances, for physiological studies have shown that the internal secretion of this gland has a marked influence on the development of dental and osseous tissue.

Recent studies show that alterations in the composition or amount of saliva are capable of affecting the teeth to a marked extent. Abnormal substances, lack of its normal constituents and loss of its alkalinity are responsible for these conditions. To understand these affections, the stu-

dent must be familiar with the composition of normal saliva, the places whence its ingredients come, the mechanism of the secretory process, and the functions of the secreted saliva.

Another source of tooth trouble springs directly from alterations in the blood supply of the pulp. To fundamentally understand such cases, the effects of blood supply on nutrition of tissues and the methods by which blood supply may be altered by physiological means must be understood. Similarly, nutritional disturbances follow nerve involvement, so that whole teeth may fall out. To understand such cases, the trophic influence that nerve cells have over tissues they innervate must be known.

In dealing with infectious cavities the bacterial cause receives great emphasis, but, as a matter of fact, infection occurs only after the infecting agent or its toxin has escaped the physiological barriers of the body. Once admitted into the body the effect of bacteria or their toxins depends not only on the infecting agent, but on the ability of the body cells by their physiological reactions to counteract and fight these agents. Take, for instance, the beautiful protective mechanism that the body has in the co-ordinated actions of the white blood cells in cases of infection! The entering germs, by stimulating the body cells generate chemical substances spoken of as hormones, which acting like messengers in time of war notify the leucocytes of an invasion. Immediately the leucocytes in the connective tissue spaces pass by diapedesis into the blood stream, and by it are transported to the scene of action. Until recently it was not known that the leucocytes, brought to the scene of action, could not ingest or destroy bacteria unless the body cells had produced still other substances, called opsonins, thus making the physiological mechanism of phagocytosis more complex.

In recent times much has been written on the value of mouth signs in diagnosing nutritional derangements of the body. The markings on the teeth, the presence of opaque spots, of cross striations, of abrasions and erosions, are among the

nutritional changes the significance of which remains in dispute. By a thorough understanding of the normal metabolism of the body, the dentist may throw much light on these questions in the future. Poor teeth are generally regarded as a cause of indigestion, but probably as many times digestive disturbances exert a deleterious action on the teeth.

In the next place physiology is the present-day basis for rational therapeutics. We have come to recognize that drugs are chemical agents which influence the body for good or evil. So we ask ourselves how a certain organ acts, then how its function may be modified by a certain drug. For example, before you can be instructed in the manner that anesthetics abolish pain you must have a definite conception of pain, how produced, how carried from its place of origin to the brain, how influenced by psychic states, etc. Then again, drugs are derived, not alone from the mineral and vegetable, but also from the animal kingdom. Our bodies manufacture certain substances which may become deficient and need to be supplemented by similar substances from lower animals. Among these substances may be mentioned pepsin, trypsin, rennet, extracts from the thyroid, adrenals, etc. To understand the therapeutic use of these substances presupposes a knowledge of their function when normally present in the body.

The lessons learned in physiology are of great value in interpreting symptoms occurring in the patient while in the chair. After one is familiar with the reflex flow of saliva, he will know why operations on the teeth cause such a copious flow. After he has mastered the swallowing reflex he will be enabled to avoid the parts of the oral cavity whence these reflexes occur, and so minimize this act, troublesome alike to patient and dentist. After the innervation of the heart has been studied one can understand why a slight injury of a nerve may cause the heart to cease beating.

In the institution of resuscitative measures after anesthesia a knowledge

of physiology is essential. How can the dentist intelligently perform artificial respiration unless he is acquainted with the wonderful mechanism which causes us to breathe rhythmically whether waking or sleeping? How is he to treat a failing heart unless he has a mental picture of its position, movements, and working mechanism? How, in fact, is he to tell in what manner the heart is behaving unless he is conversant with the heart sounds and knows where to listen for them, or knows where to feel the pulse and interpret the story it tells?

Some may argue that when one speaks of treating failing hearts and instituting artificial respiration one is passing beyond the realm of dentistry. These people would argue that the dentist is not supposed to be a medical man, as he never received a medical degree. No opinion could be more erroneous. The conferring of a degree or the awarding of a diploma should not stand in the way of saving a human life. To call a medical man in such cases means that resuscitative measures can no longer be made effective, for cerebral function is lost beyond recovery if deprived for more than five to seven minutes of blood supply. Dentistry has come to be a specialty of medicine. So it has been recognized by the American Medical Association and the International Medical Congress, and so you must recognize it.

Such are some of the relations that exist between dentistry and physiology which all the foremost practitioners at least unconsciously recognize. The question often comes up in this connection whether there is not danger of giving too much time to scientific pursuits at the expense of mechanical dexterity, so essential to the dentist. The answer is doubly negative. In the first place, mechanical dexterity without mental development cannot show itself to the fullest. The great mechanical discoveries of an Edison are as much the offspring of a fertile mind as of manual dexterity. Every instrument we handle is but the application of an idea, and it will be useful or worthless as its mental plan was sane or

faulty. Secondly, it is a misconception that physiology, taught in the laboratory as it should be, develops mental processes only. The physical devices employed in our laboratories to unravel the mysteries of nature are far more complex than those used in any surgical procedure. Physiologists use instruments to measure the pressure of the blood and to record changes in the movements or volume of the heart. They record the most temporary changes in the pulse and changes in the blood supply of organs. They measure with accuracy the speed of the nerve impulse and the rate of muscular contraction. Students in our laboratories measure time intervals as small as 1/1000 of a second. Nowhere is such careful manual dexterity demanded as in handling and adjusting physiological apparatus. I therefore express the hope that a practical laboratory course in physiology may soon be added to every dental curriculum.

CONCLUSIONS.

The chief relations that I wish to emphasize as existing between physiology and dentistry may be briefly summarized.

(1) The dissemination of physiological principles is largely responsible for the creation and rise of modern dentistry and continues to be its best advocate.

(2) Physiology forms one of the foundation stones upon which the superstructure of dentistry is based.

(3) Physiological investigations have given the teeth more than a local importance in the body.

(4) A knowledge of physiological principles is necessary to the interpretation of clinical dental problems.

(5) Physiology is the present-day basis for rational therapeutics.

(6) Physiological knowledge aids in interpreting symptoms occurring in the patient while in the chair.

(7) A laboratory study of physiology cultivates mechanical ingenuity and precision, at the same time that it stimulates cerebration on scientific matters.

PROCEEDINGS OF SOCIETIES

NEW YORK ODONTOLOGICAL SOCIETY.

Monthly Meeting, October 1908.

A REGULAR meeting of the New York Odontological Society was held on Tuesday evening, October 20, 1908, at the Academy of Medicine, No. 17 West Forty-third street, New York city. The president, Dr. W. D. Tracy, occupied the chair.

INCIDENTS OF OFFICE PRACTICE.

Dr. M. I. SCHAMBERG. Upon the request of Dr. William Tracy, to whom I showed some interesting radiographs, I desire to report the following case:

being no caries of the crown and no history of traumatism such as would cause the pulp of that root to become devitalized, I tested the tooth as well as the adjoining ones with the ethyl chlorid spray, and found them all vital. I then took an X-ray picture of the part (Fig. 1), which showed a localized area of suppuration about the apex of the tooth, that looked as though it must be due to a putrescent pulp. I again isolated each tooth in turn with the rubber dam, tested them as to vitality, and found the first bicuspid as sensitive to cold as its fellows. Then,

FIG. 1.

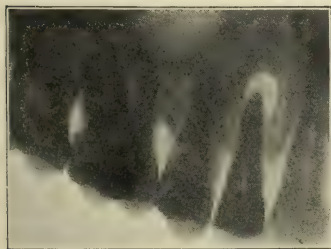
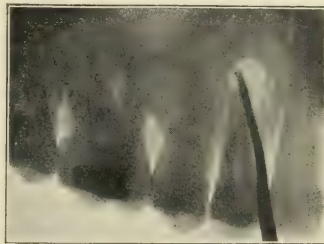


FIG. 2.



Mr. V. P. W., age forty, was referred to me for the treatment of a suppurating sinus which was discharging through the external alveolar plate above the root of the upper left first bicuspid tooth. Pressure upon the palatal side, or rather upon the soft tissue overlying the internal alveolar plate, caused a copious discharge through the opening upon the buccal side. A blunt-end silver probe passed through the opening came in contact with the denuded end of the tooth-root. There

searching for another cause, I noticed that pressure upon the gums overlying other teeth brought about a discharge of pus at the gingival margin of the gum, though the tooth in question was remarkably free from pyorrheal tendency, and the gum tissue hugged the neck of that tooth more closely than in most of the other teeth. Carefully searching for a pyorrheal pocket about this tooth, I was finally able to gently pass a scaler upward about the anterior approximal sur-

face of the root, until the instrument was buried sufficiently to prompt me to believe it to be in the abscessed area shown in Fig. 1. I then made a second X-ray picture of the part with the scaler in position, and Fig. 2 shows how we determined that this apical abscess actually occurred upon a vital tooth, the infection reaching that region through a pyorrheal pocket upon the anterior approximal aspect of the tooth. The accumulation at the apex was doubtless due to the partial closure of the pocket, as evidenced by the freedom from discharge about the gingival border of the gum.

I report this case owing to its being one of those rare instances when you meet an abscess upon the end of a vital tooth, and because of several other interesting facts associated with it; one is the necessity of combining clinical observation and evidence with the findings in the radiograph. This object lesson is forcibly presented in this case as well as in one recently sent me by Dr. Ottolengui, in which the patient exhibited an immense growth involving the mandible, the microscopic examination of which showed a typical picture of cancer. The radiograph, however, outlined a multilocular cyst, and as many of you know, these cysts are microscopically malignant and frequently clinically benign. Though an extensive operation was necessary upon this patient, I was enabled to save the temporo-mandibular articulation and a sufficient portion of the ramus and body of the jaw to retain the normal contour of the face, and to guarantee the patient the use of his jaw. This case will be reported in detail at some future time. Another interesting feature of the suppurating area shown in Figs. 1 and 2 is the fact that the former copious pus discharge ceased, and the fistula healed after the taking of the X-ray picture, though no other treatment up to that time had been applied. There is no doubt in my mind, after observing this as well as other cases that have behaved in a similar manner, that there is a decided virtue in X-ray therapy as an auxiliary method of treating obstinate suppurations.

The last but not least interesting fact

associated with this case was the immense improvement in the patient's health after the removal of the suppurative foci from the mouth. When first presented for treatment he was in poor health and much under weight, though he had been under the care of a physician for some time. Two weeks after the disappearance of pus from the mouth, the patient volunteered the information that he had gained ten pounds, and was feeling much better in every way than he had for a long time. Such cases as this emphasize the necessity of elimination of all pus areas about the mouth, if the patient's health is to be up to par.

The essayist of the evening, Dr. A. W. DOUBLEDAY of Boston, then read a paper entitled "Ploddings Toward Diagnosis by Salivary Analysis." The paper was accompanied by lantern slides.

[This paper is printed in full at page 412 of the present issue of the Cosmos.]

Discussion.

Dr. H. C. FERRIS. I want to thank Dr. Doubleday first for the contribution of a lot of hard work. This exhibition seems like a simple thing, as if we could go to some book and find what is shown here; but on the contrary, there is nothing on record in the United States like the essayist has shown, unless it be in a private collection, possibly Dr. Kirk's, who was the first to demonstrate the diagnostic value of this research.

The subject of salivary analysis has developed to such proportions that we must awake and become interested in it. There is no limit to the depths into which we may delve in this region of the unknown. The labor ahead of each man working alone in a separate field is tremendous, but by combining our efforts we may be able to accomplish something of value.

Dr. Doubleday has put most of his time on the investigation of the crystalline problem of the subject. There are some points I wish to emphasize and some questions I should like to ask the essayist.

Dr. Doubleday made reference to the

vegetable kingdom in order to illustrate the assimilation of food products. He spoke of the sulfocyanids and ammonia. I might relate an experiment in a botanical laboratory which emphasizes his point, and which shows the action of the potassium and ammonia sulfocyanids on plants that have been bleached. A plant bleached in a dark room until it is white shows, when its leaves are examined under the microscope, the circulation of the plant to be retarded, owing to lack of the chemical rays of the sun. If you drop a small percentage of the potassium sulfocyanid on it, it will at once turn green and the circulation immediately increases. The opposite is the case with a dilute solution of ammonia. We find in all exciting diseases in man, such as heart affections where the blood pressure is increased, that sulfocyanids are increased in the saliva, and when ammonia is present in excess we have a narcotic effect upon the metabolism, and a febrile condition exists.

The pathological conditions of the salivary secretions are dependent upon the quantity of ptyalin present. This active ferment has more to do in the chemistry of the body than is credited to it by the medical fraternity. When we consider that there are forty-eight ounces of saliva—a quart and a pint—passing through the oral cavity daily, containing this ferment, it is worthy of consideration. The assimilation of mineral products in the stomach appearing in this secretion within five minutes after taking shows its influence upon all digestive processes.

The essayist spoke of pathological conditions manifested in the urine—acids found as the result of an intestinal fermentation, such as indican; when this is present we find it manifest in the saliva. In examining the saliva I find that, if saliva is high in acidity and shows the presence of albumin and large quantities of mucin and acetone, indican is always present in the urine. I make an examination, both salivary and urinary, for all patients with lesions and malocclusion, at intervals of three days to a week, and I have charts of a single patient running for nine months. The plotted

curve is extremely interesting. It proves that as the kidneys are in operation and eliminate normal quantities of waste products, the acid of the saliva is reduced in quantity, and *vice versa*.

I have one of these charts in my pocket, which you may examine. Dr. Carlton Smith of Boston has given us a chart representing a single record on a single examination of saliva, which chart I am extending somewhat by considering the quantity of saliva produced, the acid index shown by the burette, the time of day, and the length of time required in the production of 20 ccm.

I should like to ask the essayist what the chemical properties of the saliva were, both dialyzed and undialyzed, when he found the particular crystal he points out and cannot name? Was the reaction similar?

I wish that I might have seen the doctor's paper so that I could have discussed it more fully, but we have to thank him for his effort.

Dr. BROPHY. I do not believe that I could add anything to the discussion which would be of special interest, more than saying that I have been delighted with the exhibition made this evening. It shows very clearly the value of research along this line, and while the essayist was reading his very interesting, scholarly, and scientific paper, my mind went back to the earlier part of the evening, when Miller was mentioned. If Professor Miller had been here this evening and had listened to this most valuable and scientific contribution, he would have been delighted. It shows to us that we have active men now, who are eminently fitted to take up the work along the lines which Professor Miller pursued so well, and carry it on even to a higher place—men who began where he left off and who have profited from his work.

I want to congratulate you, Mr. President, and the society, on the work of this evening. I am sure that when this paper has been published and goes out into the world, it will excite a deep interest on the part of medical men, who today have perhaps only a limited knowledge of the value of such research—of the value of

analysis of the saliva as an adjunct in making diagnoses of complicated cases.

The essayist of the evening is correct when he says that research and examination and a better understanding of the value of analysis of the secretions of the mouth will add largely to the field of diagnosis, and will be of inestimable value to the diagnostician in reaching a correct conclusion in making out the character and extent of diseases.

I am quite well acquainted with Dr. Michaels of Paris, who after his long years of work has brought before the medical profession the value of the analysis of saliva as a means of diagnosis. It has been extremely gratifying to me to listen to the learned address of the evening, and to see the results of the essayist's work in preparing these microscopical specimens for our examination.

I hope that the essayist will continue in his work and stimulate in the minds of others a desire to enter into the study of this most interesting phase of our work.

Dr. LEROY. I do not know whether it was understood that the peculiar crystal shown by the doctor has been denominated by him, or whether it is still unnamed, and what its function is. I am very much interested in this subject, having studied crystalline forms under the microscope for years. Salivary analysis is very important, but we are only in the beginning of extensive studies along this line. It is not one of the excretory analyses, but one from a secretory organ. We know practically nothing of the chemistry of the secreta and excreta of the human body as yet. Another step in advance will be taken when the analysis of perspiration is taken into closer consideration. Has it been noticed that many, if not most, of our patients who are affected with gout or rheumatism, emanate a peculiar odor that seems peculiar to these diseases? If we are to make the strides we expect to, we must take into consideration the analysis of all the excretory and secretory organs.

Dr. DOUBLEDAY (closing the discussion). Replying to Dr. Ferris, I would merely say that I have a large chart that

will take nearly five hundred tabulations of the clinical history, the chemical analysis, and the microscopical analysis, upon one sheet, especially ruled for final conclusions at the end of each column. I have not made these conclusions either from the clinical, the chemical, or the microscopical analysis, and did not bring separate charts of the chemical analysis with me, so will not attempt to answer this question. I shall, with your permission, postpone the answer.

Dr. LEROY. Are you giving us the name of this salt tonight?

Dr. DOUBLEDAY. Regarding Dr. Brophy's words, I wish to thank him sincerely for his very enthusiastic remarks. I appreciate the enthusiasm he has shown, and I hope that many others present may be inspired with the same.

Replying to Dr. LeRoy, if he has time, or if anyone else is interested, I will show you the slides of a known salt, and you can draw your own conclusions as to whether you think it is the salt which I have shown you in the saliva specimens, or not.

The PRESIDENT. The hour is not late, and I think we all would be interested in seeing the slides the speaker referred to.

Dr. DOUBLEDAY. [Showing slide of known salt.] The salt crystals are absolutely identical with the others, as shown in the pyorrhea specimens, except that they are very small. This is a known salt of sodium lactophosphate.

I am not assuring you or assuming that it is the salt in the other slide, but I was in hopes that someone present might recognize it.

Dr. TRACY. But you told us that mouths suffering from erosion contained this salt?

Dr. DOUBLEDAY. Yes; I have found it in every case of pyorrhea. I have often looked up the work on Diatomaceæ, and the diatom is claimed to have a calcic skeleton, also a calcic covering. The characteristic formation of the crystal under special consideration is nearly identical with the diatom *Navicula cuspidata*.

You can call this [exhibiting] the uric acid or potassium urate. I will leave it

that you may ponder upon it. The other salt, however, if it were possible to examine it under the microscope, I should like you to see tonight, if there is a microscope to be had in the building.

Dr. DUNNING moved a hearty vote of thanks to the essayist for his interesting paper, which was unanimously carried. Adjournment.

WM. B. DUNNING, D.D.S.,
Editor N. Y. Odont. Soc.

Monthly Meeting, November 1908.

A REGULAR meeting of the New York Odontological Society was held at the Academy of Medicine, No. 17 West Forty-third street, New York city, on Tuesday evening, November 17, 1908.

The president, Dr. Tracy, occupied the chair, and called the meeting to order.

INCIDENTS OF OFFICE PRACTICE.

Dr. H. W. GILLET. Noting the subject of the evening, I brought along an item which may interest you. Last year Dr. Ames suggested the use of some kind of varnish on steel instruments to be used in manipulating the silicate cements. He suggested a liquid court plaster known as New Skin. I have had for a good many years in my medicine closet one or two bottles of a varnish that I obtained from a jewelry supply house years ago when experimenting to find a transparent inlay setting material. It is sold as liquid amber. The manufacturer, Bruce Murphy of Orillia, Can., wrote me at that time that it really is a solution of amber in ether. It has a strong odor of ether and appears like amber. He claims to have some secret process by means of which he dissolves the amber in ether.

I presume many of you have found that the instruments supplied for manipulating these cements are so thick and clumsy that they are unsatisfactory for reaching the places where we want to use them.

Following Dr. Ames' suggestion, I began to use varnished steel spatulas for this work. After each use, my secretary

cleans them and dips them into the bottle and lays them aside for two or three hours in order to let them dry, when I find them coated with a very thin and very adhesive coating of this varnish. These spatulas work well in manipulating the cement and forcing it into places of difficult access.

The paper of the evening was then read by Dr. W. B. DUNNING, his subject being "The Probable Usefulness of the Silicate Cements."

[This paper is printed at page 440 of the present issue of the COSMOS.]

Discussion.

Dr. ARTHUR L. SWIFT. We are indebted to Dr. Dunning, not alone for his most scholarly and intensely practical paper, but also for the fact that, so far as I know, he is the first to bring before the profession the technical description, as set forth by the inventor in the specification of his patent, of the ingredients and the methods of preparation.

My experience has been confined almost exclusively to Ascher's cement. I agree with the essayist that its field of usefulness is limited, but am convinced that it is a most useful adjunct to our filling materials. The test of time alone will demonstrate positively the extent and duration of its efficiency.

I have employed it in a wider range of cases than those described by the essayist, not always successfully by any means, but with sufficient success to encourage further efforts and experimentation as

to the best methods of mixing and manipulation. Mixing and manipulation are, I believe, the keynotes in its successful use, not forgetting the exclusion of moisture.

The same degree of translucency is not obtainable as in porcelain, and silicate cement does not retain its glossy surface for any great length of time. But if it is properly mixed and manipulated, it should not present the appearance of an etched surface, and if the color is fairly good it looks well in the mouth at conversational distance. That it can be used easily in many places where the use of porcelain would require extensive cutting of sound tooth-structure, and would entail separation of the teeth, pain, and fatigue to the patient as well as the consumption of much more time is unquestionable. This is a factor well worth considering, particularly when dealing with patients of lowered vitality and fancied or real neurotic conditions.

Dr. Dunning did not mention the importance of always stirring the liquid thoroughly before using. I never use the dregs in the bottle of liquid. The manufacturer claims, after a series of experiments, that the use of the last of the bottle is responsible for the etched appearance of fillings, and I am fully convinced that my failures along this line were invariably due to this fact.

In the mixing, if more than one shade is to be used, the powders should be thoroughly mixed before being incorporated with the liquid. It is of the greatest importance that the mixing slab should be perfectly clean, and used only for silicate cement. It is unwise to use the same slab which is used for other cements, as the most minute foreign particles remaining would affect the silicate cement. In mixing I incorporate at once with the liquid a considerably larger bulk of the powder than the amount of liquid, mixing rapidly but without heavy pressure, keeping the mass in as small a compass as possible, adding small quantities of the powder and thoroughly mixing until the mass becomes quite stiff and tough, gradually exerting heavier pressure as the proper consistence is reached. As but

little dependence can be placed upon the adhesive qualities of the cement, the retentive shape of the cavity is important. My best results have been obtained by using the mass stiff and tough enough to feel it pack forcibly before the instrument. In this state it is but slightly adhesive to the instruments, the additional use of a small quantity of talcum powder obviating adhesion. When vaselin is used, there is danger of incorporating it through the filling in packing it to place. Having packed the mass rapidly, a slightly vaselined celluloid strip is used to force the filling to place, and the burnishing into the cavity and along the margins is then done upon the outside of the matrix, using the white celluloid strip through which the filling is visible. The surplus is rapidly trimmed away with sharp chisels and sharp knife-edged blade burnishers, and the filling smoothed with a celluloid strip.

As the essayist says, the ideal result is obtained if the finish can be completed without the use of strips and disks, but usually these have to be resorted to. I find the use of the agate burnishers with the engine helpful. After setting, I use melted paraffin, sandarac varnish, or collodion.

Dr. SWIFT. As to the effect of the silicates upon the pulp, I have thus far had no such results as the essayist referred to in the paper. I of course always take the precaution of protecting the pulp with oxyphosphate in all deep-seated cavities.

In regard to the use of steel instruments, I find if burnishers are carefully cleaned and polished on the felt wheel after each operation, no discoloration results from their use. I have had but few fillings discolor, and have in each instance attributed the discoloration to faulty manipulation rather than to the fault of the material. I have all burnishers trimmed down to a knife-edge, very thin, except of course the ball or plugging instruments, and they are very useful in removing the excess and aiding the manipulation in out-of-the-way places where there is but slight separation.

In reference to stress, I have been surprised to find how much crushing stress this material will stand. In several cases I have used it where I felt that it certainly could not withstand the force of mastication, and have been agreeably surprised. I took the liberty in my wife's mouth of building out several very large contours, and I am surprised to find how well they have withstood the stress of mastication.

In closing, I would refer to just one case which was brought to me several years ago, in which the corner of the disto-lingual plate of an upper right incisor had been worn away by abrasion, leaving the labial plate of enamel at this corner unsupported by dentin, and presenting the appearance of discoloration at this point which one has so many times seen. To put gold on that surface would of course cause it to show through the labial plate. At that time I put a thin coating of oxyphosphate over the inner side of this labial plate, and built up the corner from the lingual surface with gold. This lasted for a few years, how many I do not just remember; when the patient returned to me, the gold was worn almost through, and a portion of the labial plate was exposed again.

To put in a porcelain inlay meant extensive cutting of the tooth, and as the patient was very nervous and far from well, I decided to try Ascher's enamel. After considerably over two years' wear, that filling, which I saw only the day before yesterday, shows no signs of wear whatever.

Dr. AMES. I find myself placed in a rather embarrassing position. I came here knowing that I would be called upon to say something on this subject, and had seen a part of Dr. Dunning's paper, but by the reading of the part I had not seen I am placed in the position of one feeling that the conscientious gentlemen of this association, seeking for the truth, have been in a way imposed upon by the matter given to Dr. Dunning as fundamental truths from sources from which he should expect reliable information.

The early records of a cement of this kind are best obtained through patent

records. The earliest record obtainable is the patent specification from the Patent-office of the patent issued to Thomas Fletcher of Warrington, England, dated 1879, in which he describes a combination of calcium, aluminum, and silica fused together, which was used in connection with a paste of acid aluminum phosphate. He also took out a patent in the same year for this same combination, with which there was used an acid paste of tin phosphate. Part of the reason why these early materials or combinations were a failure lay, I believe, in the fact that these acid pastes, as many of you have noticed in connection with different cements, did not tend to give success in the formation of oxyphosphates. While the name chemical porcelain is an attractive one, and is more or less justified, because these so-called silicate cements, or silicious cements, as I prefer to call them, are very much of the nature of porcelain on account of the ingredients, they are not a chemical porcelain strictly speaking, but are oxyphosphate cements. A porcelain is a material in which certain refractory materials such as oxids and silicates are held together by the fusion of ingredients such as feldspar and other fusible materials; whereas in these cements the silicates are held together by a basic phosphate which results from the reaction between phosphoric acid and the calcium which is present—and without calcium, which is the cement-forming ingredient, there can be no hardening of the mass in the sense of making a cement such as is under discussion.

That is what these silicious cements are, from the Fletcher material down to the material brought out by Dr. McGeorge of Corning, New York, called Dentos in the course of being marketed, and from that on to the Ascher and other more or less translucent materials which have been brought out recently. I do not hesitate to give my opinion that a statement sent to Dr. Dunning by the makers of the material called Translux is based on erroneous views. When they say that the action of the phosphoric acid upon normal silicates is such as to form a cement mass,

they simply are mistaken, in my opinion. Without the calcium oxid in this class of compounds there can be no cement-forming phenomena.

In the matter furnished Dr. Dunning by the L. D. Caulk Co., there was reference to the action of sulfids on silicious cements as evidence of their ability to withstand the action of sulfids in the mouth without discoloration.

A test very easily made consists of a solution of potassium sulfid, which I find more efficient than the other sulfids mentioned, in which a mass which will discolor and take on a bad complexion in the mouth can be identified. The property can be identified after twenty-four hours or less by insertion in such a solution, and it has been a marvel to me that certain cements, which have been offered and which have been used because of the high recommendation of the makers, we will say, have not been tested by those makers by such simple processes. If a cement discolors in such a solution, a filling of it in the mouth will take on a discolored surface when it is located at a place where it is not kept clean by the friction of mastication. Some silicious cements are not just what they should be in this respect.

Mr. Pinches, in giving Dr. Dunning the desired information, simply furnished him with a patent specification as obtainable from the Patent-office, which I have read at various times and for various reasons. The language there would convey the idea that the main ingredient, the vital ingredient, the cement-forming ingredient, is beryllium silicate. The patent specifically reads that the powder is essentially beryllium silicate, and all the wording would indicate to me that all the cement-forming phenomena might be accounted for by the presence of beryllium silicate, whereas calcium is mentioned in a very vague way.

There is nothing about the combination described which would give a cement mass without this calcium, and while there may be certain valuable attributes depending upon the presence of beryllium, it has been very thoroughly demonstrated that it is not necessary to have

the latter in any form in order to produce a very satisfactory or superior silicious and translucent cement; but immediately upon saying that, I wish to state that up to the introduction and improvement of Ascher's enamel, there was no material of this sort at all dependable, and you are indebted to the makers of this material for the most satisfactory and dependable cement of this class that has gained any prominence, I believe, up to the present time. While chemical analyses of Ascher's enamel show a beryllium compound in more than negligible quantity, it need not be a foregone conclusion that the beryllium is present as a silicate, neither does the taking out of a patent compel a patentee to manufacture according to his patent. It might be said in discussing such formulæ that there are several families of these rare earths, a study of which as ingredients of silicious cements is very interesting.

I wish to say, however, that in connection with this and some other cements much faulty instruction as to their manipulation has been offered. I do not believe that a rational mixing process has yet been described, and I am sure that many fillings have been ruined by following the instructions calling for the manipulation and disturbance of the cement mass during the setting process, this disturbance being carried out by means of vaselin-coated burnishers. By stopping to think of what would be the result of so interfering with a crystallization process, it is easy to see that such instruction has been faulty in the face of our knowledge of such processes.

I am sure that if such a material is mixed according to common-sense processes, by incorporating the material thoroughly up to a point from which the maximum strength might be expected, and then, after the material has been placed accurately in the cavity and given proper form without further disturbance, if by the application of heat the crystallization or the setting is hastened and caused to take place in as short a time as possible, consistent with the comfort of the patient, finishing the mass after it has hardened, as much as is necessary—and

Dr. Dunning says that even after infinite care it is necessary to finish these fillings to some extent—there will be secured a cement mass of an integrity superior to that secured by following any set of instructions that have so far been offered in connection with any marketed product.

While it is advised to take fifteen, twenty, or thirty minutes for the insertion and treatment of these fillings by a process of burnishing, say with vaselined burnishers, I think that with any of these materials a third, or fifth or sixth, of this time is sufficient for proper crystallization if heat is applied by any advantageous scheme, such as the projecting of hot air or the flowing of molten paraffin upon the surface. This heat may be applied directly upon a cement mass, as in the case of large restorations in bicuspid and molars. In cases in which the mass is condensed beneath celluloid strips, the heat can be applied upon the celluloid, holding the celluloid tight upon the filling, when the cement mass will receive the effects of the heat through the celluloid, which in a very short time may be removed without adhering to and distorting the cement. I am of the opinion that vaselin is an abomination in connection with these materials, and that a mass of cement which has been burnished with vaselined burnishers looks better immediately upon its dismissal after that treatment than it ever does after the grease has disappeared from the surface.

A substitute for vaselin is paraffin, which I find to be most advantageous for use in the hardening of the cement mass. A strip drawn across a lump of paraffin puts the filling in ideal condition, or rotating a disk upon the lump of paraffin does the same.

In the preparation of cavities where the use of enamel is justified, a very radical departure should be made from the extension for prevention method, which has become gospel with the successful gold workers of today. For gold fillings and for gold and porcelain inlays enamel margins have properly been cut back very freely. For best results with a silicious calcium oxyphosphate, I am ready to lay down the rule that any bit of enamel

that does not impair the proper cleansing of the cavity and that does not render the cavity margin too grotesque should be retained. With an equipment of excavators such as the Darby-Perry, the Gillett, the Battle-ax, and others calculated to remove caries from inaccessible locations, proper cavity preparation is fairly simple after separation in case of approximal cavities, with the *retention* of enamel which would be cut away for operations with some other materials. In making these statements I have chiefly in mind approximal cavities in incisors.

If, in treating cavities in bicuspid or molars that reach to the occlusal surface, enamel can be retained which will give cavity edges removed from direct occlusion, and give an obtuse instead of an acute edge of enamel against which to finish the cement, the prospects are much lessened of having an objectionable angular annoyance presented to the tongue from slight wear of the cement.

I have found that working upon a chilled slab is an advantage, because all of these materials are very markedly affected by changes of temperature, so that a cement which might be objectionably quick-setting if worked upon a slab of ordinary or room temperature, could be made reasonably slow-setting if worked upon a chilled slab. I like a heavy slab, and of course a clean one, and I prefer an etched surface to a perfectly polished one. As Dr. Swift has advised, I keep a slab especially for this purpose, as it would not be proper for mixing zinc oxyphosphate.

The steel instrument, I believe, can be satisfactorily used with little friction in the packing of the cement while it is in a plastic condition and if it is being packed with an end thrust of the instrument only, while when the cavity is filled and it is desired to smooth and form the surface, a steel instrument would be thoroughly unfit for this purpose. For working upon the surface, instruments can easily be made of agate or of other non-corrosive materials.

The coating of instruments spoken of by Dr. Gillett is in my opinion a fine scheme, inasmuch as we have those fav-

orite little instruments made of steel which are so useful for packing plastics, and I am glad to know of this varnish. I know that some collodions are useful, if they have been allowed to evaporate one-half or two-thirds to form a better consistence. They are ordinarily furnished in a very dilute state, and do not give the satisfactory coating which is obtained from allowing some of the solvent to evaporate.

I wish to mention the use of zinc oxychlorid to protect pulps which might need some protection against the thermal changes which are liable to be noticed in connection with these silicious cements, which when of proper density are excellent conductors of heat. I am inclined to prefer zinc oxychlorid to oxyphosphate, inasmuch as it has certain germicidal properties; but in making this suggestion I wish to caution against the possible irritating properties of zinc oxychlorid, by advising to work it as dry as possible, and to remove the free zinc chlorid solution as much as possible from the surface by packing it under absorbent material, and dusting some of the powder upon the surface to more thoroughly absorb the excess of fluid which might be there. With such treatment I believe zinc oxychlorid to be the ideal pulp capping where the pulp is not too nearly exposed, when it would be benefited by the use of some bland intermediary.

I have already taken too much of your time, but I cannot take my seat without complimenting Dr. Dunning on his treatment of the subject, which I should have done earlier, but when I took the floor I was too full of another phase of the matter. I believe with him that the time has passed for sacrificing tooth-structure and cutting down enamel margins for opening these small approximal cavities of incisors or other teeth when we find these defects in their incipience, with the result of the objectionable and unsightly spots of gold. The time for that is past, and the children of today, I believe, will go through life without these cavities assuming the form that they have assumed under other methods of treatment. We have very reliable materials now, and

their advent was in my opinion marked by the latest improvements of Ascher's enamel, of which most has been said.

There are of course other materials which promise to be useful. There is a peculiar phase of this subject in that certain materials which have not been especially satisfactory when used in their entirety may be used in part—the powder, for instance, with obtainable acid phosphate solutions of other cements—to form a superior cement mass having desirable working qualities.

A conspicuous example is Schoenbeck's Silikat cement, which is objectionably slow-setting and does not afford a mass of satisfactory density when used entire, but has a powder ingredient which may be mixed with some obtainable acid phosphate solutions with very pleasing results. I happen to be accountable for a combination of phosphates and fluor-silicates, which may be mixed with the powders of several of these cements, to yield working qualities and resultant masses much superior to those derived from mixing entire the cement from which the powder has been borrowed. I wish to say further that the translucency in connection with these cements seems to be the will-o'-the-wisp that has led manufacturers and consumers into serious trouble.

Combinations of the silicates and calcium can be produced which will make a wonderfully resistant mass in connection with this combination of fluor-silicate and phosphate solution, with which it would seem that ultra-translucency might be a secondary consideration in a large percentage of cases. I am confident that much safer translucent silicious cements are to be obtainable in the very near future.

Dr. PERRY. The experience which we all had with Archite a few years ago has made us very cautious, and our leading men have been very discreet, and most reticent in their expressions of opinion, all of which augurs well. The present position of the profession on this subject is a very satisfactory one. I am glad we have not been too hasty and ready to pronounce upon it favorably

from the start. This action has been a safeguard and an advantage to us all. If you closely watch the trend of opinion you must see that there has been a cumulative impression favorable to this material which has been also very hopeful.

In the beginning I had some doubt as to the advantage that might come from it, but that doubt has been fading, and I am now in a position to feel that we have a valuable material. One thing is evident, namely, that this material, on the average, represents a decided advance from the oxyphosphate, for which fact alone we may be very thankful.

As Dr. Dunning so clearly stated, it is of great advantage not to have to cut away so much of the tooth. When I was young, I often cut away a good deal of the tooth-structure in order to have a chance of making accurate fillings. As I have grown older, however, I have been in the habit of taking off less and less, even if it takes more time and patience.

There is one unfortunate quality about this material—it is not very sticky. It is not very friendly to tooth-substance, so that we have to prepare cavities as for gold fillings, with undercuts, etc. In view of that fact, I have recently experimented a little in the use of the oxyphosphate in combination with this new material, taking advantage of the sticky property of the oxyphosphate, in order to retain the fillings without having to make quite such deep undercuts. I mix the cements at the same time, as nearly as possible, and put the oxyphosphate in the bottom of the cavity, and then quickly knead the new filling into that, working it in and hoping thereby to get a hold upon the surface of the cavity that I cannot get with the new cement alone.

I quite agree with Dr. Ames in his statement as to the use of zinc oxychlorid in the old way for nearly exposed pulps. There again the advantage of the anti-septic property of that old material comes in. It will mummify the surface of the cavity and retain it in that condition more effectively than anything I have

known; it is therefore very favorably indicated in very deep cavities.

Dr. HILLYER. The present discussion carries me back to a Second District Dental Society meeting of some years ago when I reported on the result of some experiments with Archite. The cement had been carried through the various chemical experiments that the dealers and manufacturers claimed it would stand, and the report was given after perhaps a month or two of exposure to the various media. That report ended with a query as to what the future might show—and the future showed!

As Dr. Ames has said, the manufacturers had taken these materials and had claimed certain properties for them, had tried them in various media, and had failed perhaps in the one test of putting them into water.

I have heard the statement made by an eminent practitioner that this filling material—artificial enamel, or anything of that sort—was absolutely unfit for use in an ethical man's practice, and that anyone who used it should really be ashamed of himself. That seemed to me like a very strong statement indeed, and in the light of what we have heard tonight and of what Dr. Perry has just said, it seems to me that we have come to a common-sense view of the use of this material. Personally, I have used it with great discretion, and in the same kind of cavities as Dr. Dunning uses it; I should not try to use it in cavities where great stress might be present.

Dr. MEEKER. This paper is very timely and interesting, because the subject has not been brought forward in any article of the dental journals. I had the pleasure last December, at Tufts College, of seeing about sixty patients, some of whom probably had never used a tooth-brush, treated with this material in the infirmary. They had as a matter of experiment from two to four fillings of the cement that Dr. Ames speaks of—Schoenbeck's cement, of Vienna. These fillings were all in good condition, except where there were incisal edges; the condition on the grinding surfaces and the

labial surfaces and gingival margins was good, and the colors were good. It being a new cement I obtained a quantity of it before going home. I had been using other cements with not very good success.

Today I saw a filling of this material which I inserted last February. It is on the gingival border of a lower incisor, and it is just as good as it was on the day when I placed it there. I have used this silicate cement more frequently than other cements since that time, and though I applied only small quantities, I have had very good success, for I have not had to replace any filling.

Dr. PERRY. In finishing large cavities on approximal surfaces that came well into the grinding surface, I have in a number of instances filled the cavity with silicate and then cut out a portion and covered with amalgam, with a view of securing a better protection, and as far as I have observed they look very well. Amalgam protects by covering the surface exposed to stress. It does not leave little edges exposed, the edges along the buccal and lingual sides remaining very smooth.* This is an advantage over an entire amalgam filling.

Dr. B. C. NASH. In the use of this material one must develop a technique suited to his individual needs. I believe that heretofore I have been using it too soft, and recently found that the proper mixture is that which will not stick to the instrument.

My favorite instrument is a pearl manicule stick, sharp at one end, flattened and convex at the other, and having somewhat the shape of a horse's hoof. I find this is a very practical instrument for the purpose.

While some of the speakers in discussing this subject seem to disclaim the general use of this material, it is evident that when they spread themselves a little they are all tending toward the same direction. Instead of limiting its use to small cavities, they are reaching out for a larger field; I therefore feel consoled over the fact that I have filled other than simple cavities. One of the reasons why we are disinclined to adopt new materials

seems to lie in the fact that it takes a year or more before we can get sufficient data about them to form an opinion.

I was quite elated the other day to find that a large approximal cavity in a devitalized bicuspid which had been filled with this material a year ago shows up without any wear or perceptible leakage, —in other words, that it is a satisfactory filling. If in such cases as this we can get good results, it should encourage us in the use of this material. Much greater technical skill may often be required for filling small cavities than for filling cavities of a more generous size.

Dr. DAILEY. I believe this material should be used only in a very limited manner, and the cavity should be carefully selected. We have had a discussion of the chemical composition of this material, and a cement expert says the formula given is wrong. It has been called brittle, and also translucent. Who knows about it? Is it soluble or insoluble? Is it compatible or incompatible?

The fact is, that we have a cement here about which we shall probably know something after ten or fifteen years. At present we know that it is a conductor of thermal changes, and that it contains calcium. If there is not sufficient calcium in the cement it will slowly disintegrate, and is therefore contra-indicated in certain teeth. I had an instance of this today. I had to take out five fillings. I took them out on account of thermal changes, imperfect margins, and imperfect fit.

With a magnifying glass I can recognize a disintegrating surface. If a filling does not fit a cavity I do not deem it wise to allow it to remain. The object of all fillings is to replace lost tooth-structure by a substitute which is as near to nature as possible, and to restore a proper masticating surface. Many of these fillings are liable to disintegrate. A filling of this character is not, to my mind, a filling that can be used indiscriminately. You have free phosphoric acid, and as has been pointed out by the essayist, a deep-seated cavity ought to be filled with a pulp-protecting material. If you will take Dr. Black's book you will

find that the disintegration due to caries will cause more free phosphoric acid to be pressed into the pulp than would be the case with ordinary means.

Dr. AMES. The question of free phosphoric acid has been frequently discussed, and while it is for a time present in any mass of cement, it is with the very object of getting rid of this phosphoric acid and of causing complete crystallization that I so strongly advocate the application of heat, and the doing away with the free phosphoric acid by causing nearly complete crystallization in a comparatively short time.

The matter sent to Dr. Dunning by the Caulk Company represents generalizations and ideals as to the proper balance of formulæ.

About properly balanced formulæ that would be of any service, I can only say that a properly balanced formula of an acid phosphate solution is one in which the proportions of acid phosphate and water are such that when the acid phosphate solution is properly mixed with a cement powder in which calcium oxid, for example, is properly blended, complete crystallization will take place owing to more or less rapid formation of basic phosphates; the application of heat is the same way of causing a rapid crystallization. While we necessarily have free phosphoric acid in the mixture, it can be gotten rid of by the heat process, and I hope that you will all try the difference between allowing it to set in its own time and hastening the setting by heat applied in some way. I cannot resist saying that I believe that with the proper improved modern cements there is no necessity for the same undercutting and shaping of cavities necessary with gold and amalgam, as was suggested by materials of earlier manufacture. In tests which I have made by filling cavities specially formed in human teeth, where it was easy to watch the margins, with some of the previously used materials it was impossible to make fillings which did not show defective margins; with the modern filling materials it is difficult to make a filling which will show a defective

margin. With some of the modern materials there is not the same shrinkage, and therefore not the same necessity for the radical undercutting of cavities as was previously advocated. This improvement unfortunately does not correct the occasional tendency to discoloration noticed even with materials otherwise quite satisfactory.

Dr. GILLETT. I wish to ask one question about the application of heat. For some time I practiced it with satisfaction, but was advised that it would cause more shrinkage. Has Dr. Ames noticed any such result?

Dr. AMES. Replying to Dr. Gillett—I do not think this to be the probable result; there is no reason why it should be. We have all reason to believe that such masses are better because of their being induced to set quickly.

Dr. DUNNING (closing the discussion). Dr. Swift spoke of the necessity of thoroughly stirring the liquid before using. That is a point in the manipulation with which I have become acquainted only recently, and have perhaps made some mistakes by not taking that precaution. He also spoke of mixing two shades to be blended in the dry powders, before adding the liquid. I have never done that, and do not quite see how I should get a satisfactory shade by so doing. I prefer to have the two powders which I think will blend to the shade I want, and then take in a little of each and note the result as they are being mixed with the liquid. When you wet the powder, of course, the color is brought out, although that color changes considerably during the setting. Neither method is free from the risk of mistakes, but I should feel that I had the more uncertain guide in mixing the powders alone.

Dr. Swift spoke of using talcum powder on the instrument instead of vaselin. I should think that particles of this might be mixed up in the filling and constitute an element of weakness, but I have never tried it.

As to the communications from different manufacturers, I have simply given them to you for what they are worth. I am not a chemist and am not

even able to speak of them in an authoritative way. In looking about for information on this subject, it seemed natural to apply to the manufacturers for all the data they would furnish. I agree with Dr. Ames that certain statements have been fairly well guarded; that is, they are very general in their nature, and perhaps do not help us as much as they may seem to on the surface.

Dr. Perry spoke of the combination of an oxyphosphate with a silicate cement. I should be afraid that a film or particle of the former might reach the orifice of the cavity and so form an element of weakness. As for doing away

with undercuts, only slight undercuts are needed in the use of this material, such as may easily be made in almost all cases.

I have not tried the use of heat with the silicate cements. Possibly in cases where the application of a hot instrument might be painful the gradual heat from the hot air blast would not be objectionable.

Dr. NASH moved a very cordial vote of thanks to be extended to the essayist for his interesting paper.

The motion was unanimously carried.

Adjournment.

WM. B. DUNNING, D.D.S.,
Editor N. Y. Odont. Soc.

NORTHEASTERN DENTAL ASSOCIATION.

Fourteenth Annual Convention.

WEDNESDAY—*Morning Session.*

THE fourteenth annual meeting of the Northeastern Dental Association was called to order at 10 A.M. on Wednesday, October 21, 1908, in the Foot Guard Hall, Hartford, Conn., by the president, Dr. E. B. Griffith, Bridgeport, Conn.

The reading of the minutes of the last meeting was dispensed with on account of their having appeared in printed form.

The session was occupied with routine business, after the transaction of which,

Motion was made and carried to adjourn until the afternoon session.

Afternoon Session.

The meeting was called to order by the president, Dr. Griffith, at 2.30 o'clock, Wednesday, P.M.

The President introduced the Hon. EDWARD W. HOOKER, mayor of Hartford, who delivered an address of welcome to the association.

Dr. N. A. Stanley, first vice-presi-

dent, then took the chair, and the president, Dr. E. B. GRIFFITH, Bridgeport, Conn., read his annual address.

The next order of business was the reading of a paper by Dr. JOSEPH HEAD, Philadelphia, Pa., on "The Importance of Speed as a Factor in Dental Operations."

Dr. JAMES McMANUS, in introducing the next speaker of the afternoon, Senator Morgan G. Bulkeley, spoke as follows:

*Mr. President, and gentlemen of the Northeastern Dental Association,—*After the remarks of our President it seems hardly necessary for me to make any special introduction at this time. I have been wondering, since he asked me some little while ago to take his place in introducing the Senator, what his object was, and I have just made up my mind that it was because he knew that thirty years ago I had a little experience with legislators, councilmen, aldermen, mayors, and with the representatives and senators

at the capitol when we tried and succeeded in getting an appropriation to erect a statue to Horace Wells. We succeeded then because all of us were united in our efforts to collect money to put up the statue in memory of that man and his discovery. Today and for several years past the dental profession has been anxious to do even a greater work, in my opinion, and that is to have, if possible, dentists appointed in the army and navy to take care of our soldiers and sailors, and our generals and officers, for all of them in their campaigning experience at times more or less trouble with their teeth.

I have had some little experience as a member of that Committee of the National Dental Association, and for years many of us have been working as unitedly as might be expected from a body of men from all portions of the country; we have been working to get through Congress a bill giving to the army and navy a dental corps. A few years ago, fortunately for our state and I think for the country as well as our soldiers and sailors, Connecticut sent to the Senate of the United States a man well known in his own state and city, who has succeeded in accomplishing nearly everything that he has undertaken, and I know of his great work in the Senate from conversing with the active members of the National Association. I know also that when I happened to be in Washington two years ago he gave up his time, and introduced me to the members of the House committee, giving me most cordial and kind attention, and introducing me to the men who had the welfare of that bill at heart. By his activity in the Senate he has done a great work in forwarding this movement; ever broad-spirited, never small, he has looked to the interest of the country, the soldiers and the sailors of our country, and I have the greatest pleasure in introducing to you his Honor, Senator Bulkeley from Connecticut.

Senator MORGAN G. BULKELEY. *Gentlemen of the New England Association*,—I feel somewhat embarrassed in appearing before a gathering of this char-

acter after a somewhat lengthy life, if you please. I have from time to time wrestled with you individually and sometimes you have had to wrestle with me, but I have never before dared to tackle a body of dentists of New England associated together.

Perhaps from my practical experience I ought to be able to say something that would be instructive. From the theoretical point of view I am not able to give you any information whatever on the purposes for which you are assembled. You have been very successful as far as I am concerned in many of your works, and you have deprived me of a good many things that I wish I had.

I notice, through the kindness of my good friend who has introduced me so pleasantly to you and with whom I have been intimately acquainted practically all my life, and remember well when as a boy he entered the office here in Hartford for the purpose of entering upon his career as a dentist, which has been a highly successful one in our community. Our lives have been thrown somewhat apart, perhaps, both of us have fallen sometimes in pleasant places, and in our careers, while they have been totally different, we have watched each other as we have gone along step by step until we have reached the majority years of our lives and look back with pleasure on the events of our youthful days.

Now, I have been chosen to speak to you this afternoon on some subjects with which you are all more or less familiar. My experience has been somewhat limited even in the lines of congressional legislation. We have the fashion here in Connecticut, and in some other states, I am pleased to say, that when men have been elevated to the Senate of the United States we have kept them in their position believing it to be for the best interest of the state, unless some party expediency may change the membership, so that our good senators Platt and Hawley, who represented Connecticut for a quarter of a century in the Senate of the United States, filling their positions with ability and credit to themselves and honor to their commonwealth, occupied their po-

sition until they both had reached their majority years, necessarily preventing some of us young men from even aspiring to so high an honor.

There is no profession I can think of that is more entitled, especially in modern times and modern practice, to higher consideration of the community than the dental profession. From what I have learned during the last few years I have become convinced that the profession in which you are engaged occupies one of the highest and most honorable ranks in the medical profession, if you please to call it such, for I shall class you as I go along in my talk with the medical profession of the country. It is only three short years ago last March that I went to Washington as one of the representatives of Connecticut in the Senate; I was assigned a member of the Committee on Military Affairs, to which all matters of the character of which I shall speak are necessarily referred. Among the earliest and most pleasant duties that fell to me as a member of that committee was that of being assigned to duty with the good old senator from Alabama, Senator Pettus, as a sub-committee to hear the presentation of the arguments for some changes in the conditions that prevailed in the army of the United States in regard to dental surgeons and dental surgery. We gave a very lengthy hearing on the bill before us, and it finally resulted in the sub-committee reporting to the full committee, and their report was unanimously adopted recommending a bill which would very materially change the relations that existed between the dental surgeons ever since they had been connected with the army, and placing them in the position of officers of the army, which the medical profession had obtained many years before. We learned in these hearings something that perhaps we all ought to have known as citizens instead of having to learn it as representatives, namely the advances that have been made in your profession, and the requirements that are necessary in order that you may be permitted—in the greater part of the country at least, and in most states—to practice your profession.

We learned of the years of study and practice which you were required to give in order to perfect yourselves in the modern methods of dental surgery, and we learned what was perhaps better than all, the contribution your education and accomplishments have made to the world in the alleviation of the suffering connected not only with the teeth but with the various functions of the body related thereto, which perhaps has given as much relief to humanity as a whole as the medical profession itself. After the careful study which Senator Pettus gave to this matter, and in consultation with him, this bill was reported, by unanimous vote of the military committee, to the Senate of the United States, and temporarily laid aside, much to the indignation of the good senator from Alabama. Upon motion it was temporarily laid upon the table, and I recall well that almost his last act in the Senate of the United States was to express the indignation that he felt over the bad treatment which he said he had received in connection with this measure, which was the first bad treatment he had ever received during his entire career in the Senate. He was a faithful and able lawyer and paid a great deal of attention to the study of the prevailing conditions, and of the position in which your profession was placed in the army of the United States in comparison with the other professional men who occupied positions in the service. That bill failed to pass the House, and at the second session of Congress, although some understanding had been arrived at with the higher authorities that there would be no effort to press this measure until the bill regulating the medical corps of the army had been adopted, (which was done by some of the members of your profession, I am sorry to say)—after consultation with those that were interested as legislators in the passage of the measure in the Senate at least, I found matters again forced by my committee, and at my request I reintroduced the bill, reported it to the committee, and it was again reported unanimously from the committee and passed the Senate as a measure by

itself, although the idea was to have the two measures, this and the army medical bill, go through together. It was believed by some—and we sometimes have to yield even though reluctantly in legislative matters—it was thought by many that if this bill were attached as an amendment, it would endanger the passage of the army bill itself, and in that way it passed without amendment and went over to the House, and the measure relating to dental surgery passed the Senate and is still pending, and will come up at the next session of the sixty-first Congress.

One thing that I think has largely tended to prevent the securing of the legislation which you so much desire, and which I believe myself is not only needed but should be granted, and should be adopted by Congress, has been the apparent jealousy in your own profession. There has been no harmonious and united action. When success seemed almost sure, we have been confronted with conditions which not only interfered with but prevented success, and the only way, in my judgment, of securing the passage of the legislation which you ought to have, which the army ought to have for its own good and for the good of the service, is by some united action on the part of the dental surgeons of the country and of those members who represent you as high officials in your varied organizations. With the wide difference of opinion with which we have been confronted in Washington among yourselves as to what should be done and what you were willing to have done, you will never secure, in my judgment, any legislation whatever. The question whether a dental surgeon shall be a captain, a major, or a brigadier-general, while it might divide you in trying to gratify some individual's personal aspirations, will absolutely prevent in almost any congress the securing of any adequate legislation.

Now, I believe that it is just as important—and the more I have studied the question the more I am convinced of it—that it is as great a necessity for the welfare of the soldier to have a trained den-

tal corps in the army as it is to have a trained staff of commanders. Without healthy men under their command, the commanders themselves are of but little use, and there is nothing I believe that will contribute more to the good health of the army in various ways than men who understand their profession of dental surgery and are able not only to treat teeth but treat those organs that are intimately connected therewith, even the stomach, in such a way as to bring about the very best results for the men.

I am pleased that I came here and can say a word to you. I expected to talk to you this evening, and perhaps would have spoken at greater length than I have this afternoon, but I have been called, as many are in the closing days of the political campaign, to go elsewhere this evening. Doubtless I shall not draw anybody's teeth, but I may perhaps draw someone's criticism in discussing some of the political questions which are seemingly more important and to which we are giving a little more attention than those questions in which you are interested at this moment.

I am greatly indebted to you for inviting me to meet with you this afternoon, and for listening to what I have had to say in connection with the congressional legislation in which you are so much interested. I hope that during my term in the Senate, and possibly during the last session of the present Congress, we may be able to impress upon our brother legislators at the other end of the capitol the desirability and the necessity of the legislation which is proposed for the dental profession, and which when adopted will give to the dental profession that position in the army of the United States to which it is entitled. [Applause.]

The next order of business, as announced by the President was the reading of a paper by Dr. PAUL GARDINER WHITE, Boston, Mass., entitled "Obstacles to be Overcome in Order to Secure School Instruction in Oral Hygiene."

[This paper is printed in full at page 435 of the present issue of the Cosmos.]

Discussion.

Dr. JAMES McMANUS, Hartford, Conn. I am not going to discuss the paper, but shall simply try to emphasize some of the points which the essayist has made in his paper, which in my opinion is one of the best we have had before this association in years. There is not a sentence nor a suggestion in the paper that is not up to the highest ideals of the progressive professional man.

I could not help thinking, while listening to the paper, how nice it would be if the men who prepare papers for the association would have the forethought and the courage to have the paper printed first as a little pamphlet, and have it distributed to each of us before it is presented to the society; we could then read the pamphlet without having to wait several months before the paper appears in the journals, as a consequence of which many of the things pass from our minds.

I had the privilege of reading over the paper a few days ago. The essayist speaks of the jealousy between the medical and dental professions. Unquestionably all that he desires will never be accomplished until the dentists become united. Dentists, in my opinion, should take a more active interest in civic affairs; they should be politicians enough to be elected to their school boards in every state of the United States, to every board of health of the country; in that way they could act with medical men and civilians on these boards, and could educate them up to a realization of their duties. In this city we have been extremely fortunate in having for several years one of our dentists on the health board; for six years we had one on the school board, and these men have in their quiet way done a great deal of good, but their results are naturally felt only gradually. We cannot do many of the things that we would like to do right away. I made a remark to one of the members with regard to the legislative work that might be done by dentists in our state society. We have at present a Legislative Committee, also other committees to

which many men are appointed, but that is the end of it; these men do not do very much work, and what is really needed is men who will work. If they went to work properly they could get the support of the members of the society and could exert an influence on the members of the legislatures. There is no dentist in the country who, if he so chose, could not make an effort to confer with the representative and the senator from his district, and I believe that these senators and representatives would be glad to listen to them, and to do something for them if they find out that they would lose votes by not paying attention. We have the right to work in that direction, and if we do so, we can accomplish something toward the end suggested in Dr. White's paper, that is, proper reading-books for the children. The style of book suggested by the essayist is not very likely to be presented to us very soon, unless more dentists become reading men. Dentists in the past have not as a rule been reading men, they do not buy any books. To give you an illustration, we have a gentleman upstairs with some dental books, and this is the first time, as far as I can recall, that there have been any agents selling medical and dental books at our gatherings. He told me that the medical publishing firms would not send anybody to dental meetings and that he has come here on his own responsibility to see what he can do. He has some very valuable books, recent publications, which really every dentist ought to own. Just as soon as dentists buy books to the extent of showing the publishers that they are interested in books, just so soon will the publishers be likely to comply with suggestions which the committee of the association would make to them on dental subjects in their books. The essayist tells us that the school books teach the children in regard to tobacco and liquor, and that they should have books that would educate them on subjects pertaining to the healthy condition of the teeth. This work has been started to some extent through the influence of a little pamphlet that Dr. Fones of Bridgeport has cir-

culated on the care of the mouth. That little pamphlet has been presented to quite a number of teachers in this city, who are becoming interested, which shows that something can be done.

The essayist speaks of the jealousy existing between medical men and dentists. I do not think it is necessary to say much about that. This condition has existed and probably will exist always, because medical men are human, opinionative, and prejudiced, just like dentists. We must make up our mind that if we expect to do anything we must do it as dentists and not depend on the co-operation of the medical men. When we have made ourselves felt, the medical men will quickly drop into line. I wish to ask you individually and collectively, for you all have probably examined the mouth of one or more physicians and have treated their teeth, what evidence have you seen that they realize the condition the mouth should be in, and what care do they take of their own mouths? If they do not take care of their own mouths, we need not expect them to say much to their patients about this subject. We must go along and do our work and not care whether we receive much co-operation from medical men or not. Although the essayist makes the statement that a large number of physicians are connected with the examination of school children, he acknowledges that so far these examinations are a farce. They are conducted with little interest, the examiners simply going through the form, and no more. The question is whether dentists, if we had a dental examining board of that kind, would do any better; yet I feel sure that if dentists had an examining board, they would in a short time effect a change.

Dr. White speaks of the mother's influence, which we all appreciate. But we also know from seeing these mothers in our chairs that they are neglectful of their own mouths, and unless they are intelligent and earnest in taking charge of their children at an early age, very little can be accomplished, for that is the period when the work should be done. Dr. Oliver Wendell Holmes was once

asked at what time one should commence bringing up a child, and he answered, in one of his pleasant moods, "Commence with the grandfather." It is our duty to commence now to teach the children, in such a way that when they become grandfathers they will be able to do good work. Books to me seem not as important as early training; that training instead of coming from mothers should come from the teachers in the primary schools. The teacher will tell a child who comes to the schoolroom with dirty face and hands that he must go and wash his hands, and if his shoes are dirty, the teacher will tell him to brush them before coming to school. We can accomplish our greatest work by so impressing the teachers of the primary schools that they will see to it that the children rinse their mouths before coming to school, and if they have failed to do so, to send them out into the hallway or to a place with proper facilities, and oblige them to rinse their mouths. If these primary teachers can be induced to talk on dental hygiene for just five minutes three times a week, and to make it a point to have the children comply with their request, the little humiliation that children of that age would naturally feel on being sent out would stimulate them to do as they were taught. If the teachers in the kindergarten could be induced to give a few minutes' talk to the children day after day, the children would very soon learn the first lesson, that is, to rinse their mouths regularly; then they should gradually be taught how to use a toothbrush, and later on they would begin to take care of their teeth.

Charitable dentistry is quite a problem in my opinion. I am not sympathetically impressed by the idea that we should go around in the schools, examine the children's mouths, and make an attempt to do a lot of charitable work. If we attempt to do that in this city with its numerous children, there would be enough charity work to keep fifty dentists employed steadily. The majority of children belong to the poorer class, and they will have to first be taught how to rinse their mouths, and little by little they

would acquire the luxury of dentistry, for I believe that it is a luxury, in which the very poor cannot indulge because there are not enough philanthropic and rich dentists to work for them individually. The children of the well-to-do have no trouble; their parents can and will certainly provide them with dental service. But the very poor classes must first be taught to be cleanly, to rinse their mouths as they rinse the hands and face; then as they grow up and get an opportunity of earning money for themselves, they will gradually come to the dentist for dental work.

Dr. A. J. FLANAGAN, Springfield, Mass. I wish to compliment the essayist on the excellent delivery of his paper.

He has said that we must create; that we must lead. I still believe, and if you will read the history of the world you must believe this great truth, that all great movements of importance in this world have been started by a few, and that the few have led and have done the greater part of the work; every great movement has had a small beginning. It took many generations to accomplish that which the pioneers of this country started to accomplish. We should therefore not be discouraged because we do not accomplish a great event in a few years.

The essayist has said that the state does not take up this matter. Anyone who is interested in the study of sociology must have come to one conclusion; that is, that the state is now stepping in and doing for the children of this country a great deal that a few years ago would not have been allowed or tolerated. This is true to a certain degree of all states.

The essayist speaks of the question of tuberculosis. There is no doubt that infections may come into the glands, especially if a person has a tendency to tuberculosis, owing to carious teeth. If you are interested in what the society for the prevention of tuberculosis is doing, you can readily realize that it would be well for the dentist to recognize the fact that if we are a part of the healing profession, we have a duty to perform in co-operating with the medical profession in preventing tuberculosis. All the talk

and all the idle words we may use will never accomplish the concrete without an effort along certain lines, such as the Massachusetts Dental Hygiene Council is following at the present time.

The essayist speaks of the good that may be accomplished through a book on this subject. If that is the case, the only book that will accomplish anything along this line is one that is backed by some organization. The national organization, for instance, should appoint a committee to prepare a book suitable for the laity and backed by their authority to give some significance to the work; in other words, have the book guaranteed by some authority. It would not do for an individual to do that, because such a book would not bear weight, and we would find ourselves waiting many years to have a pronounced good accomplished by individual effort.

Dr. White also speaks of the teeth being of more importance than the eye or ear. I wish to say to the essayist that he would not find it an easy task to produce in the minds of the everyday people the impression that that is true. Dentistry is a peculiar subject in this respect; few cases come under our care in which life and death are at issue, therefore in the mind of the average person there is the general thought that dental diseases, dental accidents—anything in relation to dentistry—is seldom or never of such serious import as to involve life or death. You can therefore readily understand why the public looks on us in the many ways they do.

The essayist speaks of this paper that he read in Boston being turned over to the department of athletics for consideration. I wonder if a medical idea coming before the school board in Boston would be treated in a like manner. I wonder if the profession of medicine would allow it to be treated in that way?

Dr. White says that the medical men cannot be depended upon to make proper examinations with regard to the teeth. This is the vital portion of his essay. I wonder how many men present have said, "I am a part of the medical profession, dentistry is a branch of the medical pro-

fession." If that is true, think of what we are doing. If a man says, I am an eye or ear specialist, is he dissatisfied with the medical inspector calling attention to the affections of the eye and ear? If we maintain that we are a part of the medical profession we have no right, in my mind, to take issue with the medical profession. I may be wrong, but I am speaking from the standpoint of reason. On the other hand, if we maintain that we are a separate and distinct profession, we have the logical right to appoint dental inspectors. If you are a part of the medical profession you must allow the medical men to call attention to the diseased conditions of the teeth, and it seems to me that we are going astray when we demand in a vast majority of cases that we shall have the recognition that will grant us the privilege of having an inspector examine the teeth of the people. What are these diseased conditions? Suppose a child presented to a medical inspector with carious teeth, do you mean to say that that man is not educated enough to record the fact that the child is affected with caries? Suppose the child has an hypertrophied condition of the gums, cannot the medical man record that fact without the dentist being present? I cannot understand why we object to these things. It seems to me that we had better stop criticizing the various towns and cities for not granting the special privilege of having a dental inspector.

The essayist speaks of some people asking what the dentist expects to get out of it. I wish to say to Dr. White that never has a man occupied any extraordinary position in any city without being subject to criticism. There are two kinds of criticism, destructive and constructive. Anybody who occupies any official position must be a peculiar individual if he cannot stand a certain amount of criticism; that is a part of human nature. It is frequently the price of success.

The essayist speaks of the question of vaccination being forced on the public. True enough, but just think how many years ago this movement started. In a few years the states of this country may require dental inspection of the human

mouth. This is just as possible and probable as in the case of vaccination.

The essayist speaks of the amount of money being spent in Boston to introduce in the public school the teaching of the Gaelic language. That is what we call class interest. It is just the same, for instance, as if some other nationality enforced the teaching of the Slavonic language; it is simply a question of the greatest good to the greatest number. If class interest, then, can succeed in introducing the study of the Gaelic language in the schools, it seems to me that if I were a Boston man, I should make an effort to start a movement in behalf of the members of the dental profession in Boston to use some of the methods which the people have adopted for the benefit of the languages. We are too backward in putting men forward to obtain results. We expect to be successful without any effort. The average practical politician is not interested in the abstract things, he is interested in the concrete, and the concrete represents to him, How many votes have you or how many people are back of you, or what do you represent? Do you mean to tell me that if of the eighteen hundred-odd men practicing dentistry in the state of Massachusetts we had one thousand in our society, and went up to the State-house to ask for legislation, we should not receive a better hearing and have more influence than if we had only a couple of hundred? The whole trouble, in my opinion, is that dentistry is not organized. Intelligent agitation will do anything of worth in this world, and history proves it. What we need is organization and intelligent agitation.

The essayist speaks of the one thousand requests that were made of him to prepare something for the various journals. That only illustrates the value of the dentist using the public press. It has been my experience that the average newspaper seems to be interested in exploiting all that is bad, all that is deplorable. They hire men to gather scandal and pay them big salaries for it, but how many newspapers are interested today in paying an ordinary reporter for

reporting on the good things in life? That is the condition which exists in this country today, and most everywhere—the great and good things are passed over, and no interest is taken in them because the people are not interested. That should teach us that if we had a committee of the National Association empowered to prepare and circulate articles of benefit to the public, hundreds of newspapers would be glad to print them provided that they are properly prepared for the papers, for newspapers will not waste their time in delving into complicated matters of a professional nature. Then why not take advantage of that and appoint a press committee that will prepare matter of such a character as the average reader will be interested in?

This all leads, in my opinion, to one great thing, and that is, that no matter how many papers we may write, how many essays of worth we may publish, we are confronted by the general conditions in this country. We may take for instance the problem of the American Medical Association. If you are interested in history and will go back twenty-five years and see what the profession of medicine represented in this country at that time, you will be astonished to find that as a profession they amounted to very little in legislative and educational matters, or in matters of general interest to the public. Why? Because they were not organized on a proper basis. Think of it, gentlemen. We are forty thousand in number in the United States and we have a paltry six hundred men in the National Association, and I am informed that of these six hundred only four hundred are legitimate members. And yet we expect to educate the public; we expect to legislate for the army and navy! If there was ever an important lesson taught, it was taught this afternoon by Senator Bulkeley when he told of the lack of unanimity, the want of organization in our profession. Just think what the American Medical Association has accomplished in the last few years with regard to the important Pure Food Act. This and other important movements eman-

ated from the American Medical Association with its fifty thousand members, and with its own journal.

It seems to me that we are lame, that we are weak; that we are sayers of words and not doers of deeds. The time has come when we must recognize the necessity of electing men in our various specialties to go before the legislatures, and not stand back and think that it does not make any difference to us. It is a question of organization, a question of pushing intelligent men to the front, and it is the duty of these intelligent men to labor not for themselves but for the profession.

Dr. N. A. STANLEY, New Bedford, Mass. The subject under discussion is one of the most important with which we have to deal at the present time. It is demanding our attention and through us it will reach an intelligent public and receive its deserved support. At the present time, as many of you know, an anti-tuberculosis exhibit is being held at Fall River; among the exhibits is that of the Massachusetts Hygiene Council, and for this reason, if for no other, we should have had the exhibit at this meeting. Here is an object lesson that the people can see. The question of introducing into schools the subject of oral hygiene is one that is bound to be solved, and its solution must be brought about largely by the dentists in the community. Physicians are becoming interested in this movement, and the school committees must be impressed with the importance of this work.

I cannot agree with Dr. McManus that we must work independently of the physician. We must work in conjunction with him, and there should be no dividing line. The physician is coming to recognize more and more the valuable work the dentist is doing in oral hygiene, and that he is a powerful ally in the prevention of disease. To get down to practical results, the public is becoming more interested in this question, is beginning to recognize the benefits to be derived, and will give us its hearty co-operation. The question is how the work is to be carried on, and how we are to obtain practical

results. In the large cities, where there are dental infirmaries, the matter is comparatively simple. In Brookline the teeth of the school children are examined, and the town appropriates a certain sum of money for that purpose. The children are advised to consult a dentist or visit the infirmary. But this condition does not exist in the smaller cities. In most cities of any considerable size there are hospitals, and the medical staff can surely be interested to such an extent that a dental clinic can be held in connection with the hospital and be supported by the people. But this is the problem that confronts us at the start: To obtain practical results we must get the children themselves interested in the care of their mouths. You will not accomplish much by simply telling them to "rinse their mouths." You must interest them in the subject by talking with them, by explaining the benefits to be derived from a clean, healthy mouth, by appealing to their pride, and by educating them in every possible way to a realization of the importance of proper care of their teeth.

Dr. C. E. ABBOTT, Franklin, Mass. I wish to briefly commend this paper. Almost every paragraph in it is valuable and worthy of all the enthusiasm which the essayist has displayed; yet I wish to add one word to the subject. The essayist spoke of antipathy in the state society; he did so because he is not a member. He spoke of antipathy in the alumni societies, and did so because he is not a member of a dental organization. In regard to the support which this movement should receive, I wish to say that while I was a delegate to the recent Republican State Convention of Massachusetts I learned the importance of organization. It is often necessary to fight single-handed, but as a rule much more is accomplished by organization.

I have never found unfriendliness among dentists. When going to Philadelphia as a student I received the greatest kindness and many favors from Dr. Kirk and others. As a stranger in Boston and other cities, I have received more courtesies than I deserved because of

anything I had done. When Dr. White's name came up before our society for membership we were all glad to have him as a member. Once in a while an originator stands alone and fights against organization, but I believe that more is accomplished by organization. If Dr. White had invented oral hygiene it might be necessary for him to stand alone and fight for it, but as I understand it, the American Academy of Dental Science, the Harvard Odontological Society, and the Harvard Alumni Society are all doing organized work along this line, and it is not surprising that some of the members of the Boston public press should ask by what authority he speaks.

Our goal must be reached by gradually educating the public sentiment, by each dentist speaking to his patients, by prominent members of dental organizations speaking to public gatherings, by each dentist practicing sterilization, doing thorough work, recommending cleanliness, exemplifying cleanliness, and so systematizing his work that he will have time for all these better things, and by making himself an all-round man, worthy of the respect and support of all his fellow men in any undertaking to which he turns his powers.

Dr. WHITE (closing the discussion). I am very glad that my paper evoked such a favorable discussion, and shall not take much of your time in closing the same.

Dr. McManus spoke about the teachers in the primary schools instructing children in oral cleanliness, which reminds me of the time when I was a pupil in the primary school. One teacher used to go over the room on an average of two or three times a week, and make us all place our hands on the desk; then she would look at our finger-nails, and during the week she would lecture for probably ten or fifteen minutes on the importance of cleanliness. After finding a dozen or more children with dirty hands, she would march them all out in the corridor and make them wash their hands. A short while ago I saw this same teacher, and her mouth presented a most foul, filthy, and unwholesome condition,

and yet she was all the time talking about cleanliness in the school.

Dr. Flanagan said that I claimed the teeth to be of more importance than the eye or ear. That is not what I said. I stated that teeth are of more importance to the general health than either the eye or the ear, for the eye or the ear only affect the individual student, while a single unclean mouth may vitiate the whole atmosphere of a school-room and become a fruitful source of disease.

Dr. Flanagan also said that this petition was referred to the department of athletics. In reality the petition was referred by the school board to the board of superintendents for consideration and report, and at the meeting of February 1908 they reported as I have already mentioned in the paper. This department of physical training and athletics is a newly established branch of the public school system in Boston, and it seems only right for the school authorities to consider that a matter coming under the direction of medical supervision should be referred to that department; but it was in this department that the movement received its first serious check and this is as probably due to the medical men connected with it. As I said in the paper, the man who is at its head is a physician and holds the position of director of hygiene in the Boston public schools, and in his hands the matter is now lying.

One of the speakers brought out the question of co-operation between the medical and the dental professions. I believe this co-operation to be essential, but I do not believe in letting the physician go and tell the people that dentists do amount to a little after all, that the question of oral hygiene is important, and to advise the public to seek the dentist when work of this kind is needed.

I believe in the dentist exploiting his own cause, and I wish to say that when I commenced this work, the Dental Hygiene Council was not in existence; it has only been in the last year or two that the Dental Council has undertaken any work along this line. Then, again, I understand that the Dental Hygiene Council was formed upon the suggestion of a physician—Dr. William Woodbury of Boston. He is responsible for the foundation of the Dental Hygiene Council. Does it not seem as if the physician were telling the public that we are of some little importance? Why not exploit our own cause?

Someone spoke of my not being a graduate of a college or something to that effect. I am a graduate of a college; I simply made the remark that there was jealousy between the two colleges in the New England states, because when I invited them to join in this movement I was met with answers like this: "I cannot give up my time to this work," or "It is a very good idea and surely should go through, but as you are not a graduate of my college, or as my college is doing work along this line, I cannot sign your petition."

I have covered, I think, everything that has been brought out in the discussion, and I shall close by saying that the last word will not be said on this subject until every child in the public schools throughout the civilized world has received the enormous benefits of dental examinations and of instruction in oral hygiene; until that is accomplished we should not lose courage, but press forward until victory is perched on our banners. True is the motto, "Keep pure the mouth, the gateway of life!"

The association then adjourned until the evening session.

(To be continued.)

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EDITORIAL DEPARTMENT.

DENTISTRY AND TUBERCULOSIS.

IN the present active crusade against tuberculosis and the splendid popular educational movement that is bringing a knowledge of practical preventive measures directly to the public mind, the dearth of instruction as to the important part played by oral conditions in connection with tubercular infection is conspicuous. Medical inspection of school children is being more generally provided for and many cases of tuberculosis in its incipency are being isolated and put under appropriate treatment, and it is probable that in the near future practically all cases will be recognized and not only be placed under conditions that will eliminate them as factors of danger to non-infected children, but that they will be given such treatment as will tend to their restoration to normal health.

This phase of the work, however, deals only with established cases of infection in which the disease is already manifest. The prophylactic aspect of the question is receiving a fair amount of consideration, and practical attention in the way of improvement of hygienic conditions in schoolrooms, a better and more frequent fresh-air supply, pure drinking-water, etc.; but when all these features have been attended to, it still remains the fact that if an intelligent and expert examination of the mouths of children in the average public school were made, it would be found that from 75 to 95 per cent. were in need of the services of a dentist for the treatment of caries or other dental disorders, and still further, that all or nearly all of the mouths would be in an unhygienic condition from lack of ordinary personal care.

Every dentist knows and every physician ought to know that the human mouth in an unhygienic condition due to lack of personal cleanliness is an incubator of pathogenic germs, and that even in an ideally clean condition it is the portal of entry for nearly all the disease-producing germs that infect the organism in various ways. It has been scientifically demonstrated that many pathogenic germs are constant inhabitants of the human mouth, that the tubercle bacillus in very many instances is found among the bacteria of the mouth, that invasion by the tubercle bacillus takes place via the oral cavity, finding a lodgment in the lungs by the act of inspiration or an avenue of entrance into the tissues and circulation via the pulp-canals of carious teeth, producing *en route* tubercular infection of the cervical lymphatics and destructive inflammatory reactions in the jaw-bones.

With these data demonstrated beyond scientific peradventure, it cannot be doubted that a medical inspection which deals only with the isolation and treatment of established cases among school children is attacking the problem after the damage has been done. It does not go far enough back to reach the origin of the trouble. Infected saliva and the readiness with which it may become a vehicle of contagion among school children should be taken under consideration, and in connection with the anti-tuberculosis crusade there should be instituted a campaign of education for securing a general condition of oral cleanliness and dental health. Either school medical inspectors should be educated in the diagnosis of

oral conditions, or trained dental specialists who are so educated should be appointed to look after this prolific source of danger to the public health.

ANOTHER CHLOROFORM FATALITY.

THE *Frederick News*, of Frederick, Md., for February 24, 1909, publishes an account of the death of a patient, a woman thirty-three years of age, who expired suddenly in a dentist's chair while undergoing an operation for the extraction of teeth under chloroform narcosis.

We had supposed that the danger of using chloroform as a general anesthetic for the operation of tooth-extraction was sufficiently well known, and that the record of chloroform fatalities in the dental operating chair was sufficiently large, to have prevented a further repetition of the foolhardiness of using chloroform under these circumstances.

When the bad record of chloroform anesthesia for dental operations is considered on the one hand, and when the practical safety of nitrous oxid is considered on the other hand, the use of chloroform anesthesia in dentistry seems inexcusable. The fact that the anesthetic in the Frederick case was administered by a physician simply shifts the responsibility, but does not in the slightest degree mitigate it.

REVIEW OF CURRENT DENTAL LITERATURE.

[*Deutsche Zahnärztliche Wochenschrift*, Sept. 19, 1908.]

THE SIGNIFICANCE OF ARTIFICIAL HYPEREMIA IN DENTISTRY. BY DR. FRYD, HAMBURG.

Every pathological condition sets to work certain reactionary inner forces of the organism which tend toward natural cure. This recognition has led Bier to his doctrine of

employing artificial hyperemia as a therapeutic agent. The author investigates the practical usefulness of this method for dentistry.

The strong active hyperemia which follows the application of the suprarenal preparations involves dangers which are to be considered especially in their use in painless operative dentistry. If an injection is made in order to painlessly excavate a tooth with vital

pulp, ischemia of the pulp will follow. This ischemia of short duration involves very little danger. As soon as the influence of the anesthetic ceases, however, strong arterial hyperemia follows. In other parts of the human body these disturbances of circulation are balanced by the immediate formation of collateral paths. This is impossible—or possible to only a minute degree—with the pulp that is inclosed by rigid walls and only communicates with the system by way of the narrow apex. The swelling due to hyperemia, however, produces a strangulation at the apex, the result being a contraction of the venous system and a passive congestive hyperemia. This is very apt to bring about the degeneration of the pulp, which is not capable of dilatation. This seems a strong argument against the use of local anesthetics for the painless preparation of vital teeth. The evil effects are noticeable only after some time, and are proportionate to the width of the foramina. Nevertheless, the contra-indications are greater than the indications, for the greater the degree of painlessness, the greater the danger for the vitality of the pulp.

Active arterial hyperemia by means of hot and moist poultices in some cases of periostitis, by the application of ice or the injection of adrenalin or similar preparations in some cases of periodontitis, has led to very favorable results. Of greater importance than the arterial hyperemia in its relation to dental practice, is the passive or so-called congestive hyperemia, which takes place naturally in every inflammation. In order to produce a congestion of the blood in the head, a rubber bandage of 3 cm. width in adults, of 2 cm. width in infants is used. This bandage is applied, according to Bier, in such a way that only the thin-walled veins are compressed, while the strong-walled arteries are compressed little or not at all. The bandage is applied below the larynx, and tightened until the face appears slightly bluish red and somewhat bloated. In dental practice an application of from eight to ten hours is sufficient. Bier was especially successful in serious cases of parulis. Congestive hyperemia is not indicated in acute and subacute periodontitis nor in chronic periodontitis, where the tooth is to be preserved.

After an extraction the congestive hyper-

emia will successfully prevent osteitis or osteomyelitis. Especially in serious osteitis, which often causes insufferable pain, the hyperemia will alleviate the pain. Large abscesses and cysts in the maxillæ, also cases of alveolar trephining or resection of the apex of the root, heal much more readily after the operation under the application of the congestive bandage.

Another means of producing congestive hyperemia consists in the use of a suction apparatus with purely local action. A large, very tight aspirator glass syringe is fitted with a thick short rubber hose to which a cup or hemisphere of hard rubber with mouthpiece is attached by means of soft rubber. These suction cups may be made to fit individual cases. In case of an abscess the suction cup is pressed tightly upon the gingivæ around the abscess, and the rod is slowly drawn up. After a sufficient vacuum is established the secretion will be seen rising in the piston. The influence of the suction apparatus is maintained until blood of lighter color appears. The apparatus is released by pressing the rod slightly downward. This method of treatment is favorably indicated if an abscess exists at the apex of the root with a fistula, also in small fistulæ such as remain after extractions owing to irritation from small splinters of bone. Larger cups may render good service in chronic thickening of the periosteum with voluminous increase of bone, which sometimes persists, especially in the mandible, after extractions, on account of serious periodontitis.

The action of tincture of iodine and of the ether spray in periodontitis is to be explained by the production of an inflammatory hyperemia of the epithelial or mucous layer with slight anemia of the lower tissues. This anemia is followed by a gradual hyperemia with resorbing action. The alleviating action of iodine, then, is to be attributed to a deviation of the blood supply.

The whole therapeutic principle of hyperemia is based on the following scheme: (1) Primary hyperemia—(a) arterial, (b) venous. (2) Secondary hyperemia—(a) arterial, (b) venous.

Arterial primary hyperemia is produced naturally by the action of the muscles, of heat or similar factors, and primary venous hyperemia by inflammations. Artificially, pri-

mary arterial hyperemia can be produced by hot air, etc., primary venous hyperemia by artificial congestion. Secondary arterial hyperemia spontaneously follows preceding ischemia of some portion, produced by the congestive bandage or by injection of a supra-renal preparation. Secondary venous hyperemia is a consequence of secondary arterial hyperemia in organs which do not permit of a rapid balance of circulation, such as the pulp. Artificially, secondary hyperemia is produced by cauterants, whose application involves the transition of arterial into venous hyperemia.

[*L'Odontologie*, Paris, November 30, 1908.]

APPARENTLY SPONTANEOUS GANGRENE OF THE DENTAL PULP AND ITS COMPLICATIONS. BY DR. ANDRÉ JOSSU.

Although dental caries is the most common way by which pathogenic micro-organisms penetrate into the pulp, it is not necessary for the production of gangrene. If the pulp is destroyed by a mechanical, physical or chemical agent aided by a pre-existing lesion such as caries or abrasion, the gangrene will not pass unnoticed. On the other hand, the destruction of the pulp seems spontaneous when it is due to an indirect cause such as faulty circulation, nervous trouble or alteration of the blood. The pulp being a terminal organ, the destruction of the root-artery produces gangrene, there being no collateral channel which would balance circulation. This fact is evident in a single-rooted tooth. In multi-rooted teeth in which the pulp is vascularly irrigated by several branches, these complement one another unless the pulp be affected in its entirety. The term "dead tooth" is incorrect even if applied to a tooth whose pulp has lost its vitality, since the cementum still receives its vascularization by means of the pericemental membrane. This explains the solidity with which such pulpless teeth remain implanted, preserving normal articulation.

In the etiology of apparently spontaneous gangrene of the pulp purely dental causes, causes of environment, and general causes must be distinguished. Dental traumatism is by far the most frequent and most varied. If the traumatism is single, it must be of sufficient violence. This is often observed in children after falling or being struck on the

chin, or after suddenly and violently biting on a hard body held in the mouth. Repeated though minimal traumatism may also cause the destruction of the pulp. This is often noted in seamstresses who are in the habit of biting thread, in persons who habitually grind their teeth, in patients with faulty articulation, etc. Traumatism is sometimes to be ascribed to dental treatment such as rapid temporary separation, shock from extraction of a neighboring tooth, regulating appliances, crowns fitted on vital teeth with imperfect articulation. The destruction of the pulp in these cases is to be attributed either to a rupture of the vascular pedicle or to the production of a periapical arthritis, in consequence of which the vascular bundle is strangled in the apical foramen and becomes obliterated by thrombosis. Faulty circulation in certain cases of hypercalcification or calcareous nodules may have the same destructive effect.

Among the causes from environment we find traumatism of the face, fractures of the maxillæ, certain surgical traumatisms occurring during surgical operations, for instance, the curette striking the dental vessels during radical treatment of sinusitis. Tumors may also act destructively by compression or propagation. Purulent accumulations originating in the neighboring alveolus or in the sinus may obliterate the bloodvessels of the root or produce their destruction by septic thrombosis. This may occur in consequence of alveolar inoculation by a foreign body, tooth-picks, hair from a tooth-brush, or a fish-bone.

In regard to general causes of gangrene of the pulp due to nervous troubles and alterations of the blood, the etiology requires further investigation. If trophic disturbances in the proximity of the trigeminal nerve diminish the resistance of the gingivæ, infection may set in, which in conjunction with other nervous trouble may become fatal to the pulp. The direct bearing of infectious diseases upon the destruction of the pulp has not been sufficiently proved, yet the indirect influence of nervous troubles, intoxications, infectious or diathetic diseases is not to be denied.

Gangrene of the pulp occurs most frequently in adolescence from the eruption of the permanent teeth on to the sixteenth or eighteenth year. At that period the destruction of the pulp arrests the calcification of the tooth; often the root is not yet perfectly formed.

The multi-rooted teeth are rarely affected; the single-rooted teeth in order of the frequency of this affection are the lower incisors, the upper incisors, and the canines. Frequently several teeth in the mouth present dead pulps owing to the external or internal influences to which they have been simultaneously exposed. Yet their symptoms may be different and render difficult the diagnosis of the tooth responsible for a complication. Such complications arise in consequence of infection. The pathogenic germs must necessarily penetrate the apparently intact hard portions of the tooth in solutions of microscopic continuity. Enamel fissures, minute fractures, cracks, erosion, abrasion or portions of the neck which are denuded of enamel offer an entrance to the micro-organisms, which, after penetrating into the interglobular spaces of Czermak, enter the ivory tubules empty of Tomes fibers and reach the pulp-chamber. Contamination by way of the apical foramen or infection of central origin is doubtful.

The infection of the pulp does not necessarily produce complications. The germs seem to be attenuated in the pulp and do not exert themselves sometimes until very many years after its mortification. Accidents occur owing to an increase of the virulence of the microbes or owing to a diminution of the resistive forces of the organism. Local irritation or such general alterations as produced by grippe, typhoid fever, rheumatism, pregnancy, menstrual periods, overexertion or cold may give rise to complications.

The primordial complication is alveolo-dental arthritis, often accompanied by rare-facient cementitis. All the complications of infectious penetrating caries may ensue, with the only difference that the tooth is not carious, which condition often leads to faulty diagnosis. The symptoms, although they are not infallible, consist in discoloration, opacity of an area surrounded by the lighter zone formed by the solid walls of the tooth and forming the shape of a U open toward the root, and a dull sound upon percussion. If these symptoms fail, the sensitivity of the dentin is tested by thermo-cautery or by applying ethyl chlorid spray on a pellet of cotton. If there is still any doubt, an exploration pit is burred which, if there is any sensitivity, is filled again. If the pulp is dead

the tooth is insensitive, and a nauseating odor is perceptible upon perforation of the pulp-chamber.

Even after this test the diagnosis may not yet be complete as to which tooth is causing the complication, if there are several dead teeth in the mouth. Therefore the seat of pain is to be located by percussion, and symptoms such as abnormal mobility of the tooth, arthritic signs, dental crepitation must be observed, and in case of a fistula retrograde exploration of the responsible root and injection of liquid must be resorted to.

The prognosis of gangrene of the pulp is favorable, except that the tooth is arrested in its calcification, becomes friable, and is handicapped in its vital resistance to infection and caries. In order to preclude possible complications, the pulp-chamber should always be cleaned, and eventually the tooth bleached for esthetic reasons. As a rule the opening, cleaning, sterilizing and filling of the root-canal and tooth will rapidly effect a cure in case of neuralgia, adenitis, active congestion, abscess or fistula. In long-established cases, where an apical seat of infection exists, curetting is indicated to promote cicatrization or resection of the apex. Extraction should only be considered as the very last resort, especially since the teeth most generally affected are important for mastication, phonation, and facial beauty.

[*Deutsche Zahnärztliche Wochenschrift*,
Munich, January 30, 1909.]

RESULTS OF DENTAL EXAMINATION AND TREATMENT OF TUBERCULOUS CHILDREN. BY DR. O. WEIDEMANN AND DR. ED. LUBOWSKI, BERLIN.

There is no disease in which healthy and clean conditions of the mouth are of such vital importance as in tuberculosis of the lungs. Correct breathing and correct chewing require special attention in tuberculous, scrofulous, and rhachitic children, since their weakened organisms are very susceptible to intruding bacteria. Tubercle bacilli are found in carious cavities, and it has been proved that especially unclean portions of the mouth constitute a portal of entrance for the tubercular poison. Partsch of Breslau reports a case of grave tuberculosis caused by a carious tooth with such acute inflammation of the lymphatic vessels that an operation be-

came necessary. Also many cases of tuberculous infection by way of the alveoli have been recorded. These and the author's own observations leave no doubt as to the fact that dental caries is responsible for many cases of tuberculosis. Tuberculous tumors situated opposite carious teeth resist every treatment, until the carious teeth are repaired or extracted. Long-established lymphatic swellings also will generally not yield until the carious teeth are treated.

All the generous efforts of charitable and public institutions for the cure or prevention of tuberculosis are of no avail unless the causes of the disease are removed, and among the most dangerous causes are beyond doubt defective teeth and unhygienic oral conditions which exist especially in children. No child can thrive, despite the best of care, if its mouth contains bad teeth and suppurating roots. The infectious micro-organisms of the oral cavity, the products of putrefaction in carious cavities, and suppurative secretions from bad roots make havoc not only of the individual affected but also of his fellowmen; for owing to these pathological conditions, bacilli, pus germs and septic particles are thrown out with the expiration and the saliva in speaking, singing, or crying, and communicated to the environment, endangering, especially, predisposed people. For this reason many sanitariums only receive patients with well-cared-for teeth, maintaining that only a body protected by healthy intake of food is able to withstand the onset of tuberculosis.

The first institution for the treatment of tuberculous children to devote attention to the dental treatment of its inmates, is the Red Cross Sanitarium at Hohenlychen, where the authors have collected their statistics for the year of 1908. Of about 1000 children admitted 62 per cent. were girls, 38 per cent. boys. Most of these children came from large cities—Berlin and Hamburg. The age of the young patients was from five to sixteen years. In these 1000 children examined, 5662 teeth were beyond repair, not counting the carious teeth that could be saved, of which 3600 were found in about 600 girls, 1750 in about 350 boys. In the diseased permanent as well as deciduous molars frequently a broad circumscribed field of caries was found together with a greenish, viscous deposit, which is only found in tuberculous children. A great many

irregularities and anomalies of occlusion and of the teeth were found, in the boys about 180, in the girls about 205 anomalies. Of pronounced rachitic distortions of the maxillæ and teeth 70 were present in boys, 88 in girls. V-shaped and prognathous jaws were observed in 51 boys and 66 girls, protrusion of the mandible in 8 boys and 15 girls, diastema in 24 boys and 29 girls. Numerous other anomalies observed consisted in supernumerary teeth, absence, rotation and retention of teeth. Especially retention of the upper lateral and canine was frequently noted in tuberculo-rachitic children.

For treatment, 775 teeth were extracted in 550 children, 84 under local anesthesia; 50 teeth, incisors and canines, were treated and filled. For preservation of the bicuspid and molars frequently silver nitrate was applied. In 5 children, 3 boys and 2 girls, more serious operative treatment was necessary for the extirpation of epulids and large abscesses. In all children, after the extraction of decayed and painful teeth and roots, an increase in appetite and weight was observed. These necessarily limited observations furnish convincing proof that, in the future, regular methodic dental treatment must go hand-in-hand with the medicinal treatment of tuberculosis.

[*Le Laboratoire et le Progrès Dentaire*, Paris, December 13, 1908.]

FILLINGS, INLAYS, AND GOLD CROWNS WITH SAFETY CANALS. BY DR. H. LÉGER-DOREZ.

The author suggests a precautionary method for the possible recurrence of infection in teeth with caries of the fourth degree. His method is designed to afford access to the root-canals of a tooth that has been filled with a gold inlay, with tin, or amalgam, or that has been crowned, without having to remove the entire filling. In fillings he simply burs canals which would approximately correspond to the natural internal anatomy of the tooth, without, of course, letting these canals come so near the masticating surface as to impair the durability of the filling. If the tooth becomes infected, it is only necessary to penetrate with a bur through the upper layer of the filling to the opening of the safety canals, which are filled with gutta-percha before the final finishing of the filling.

For gold inlays, two slightly cone-shaped pivots of annealed iron are loosely inserted into the root-canals so that they come within about one millimeter of the masticating surface of the future inlay; the wax impression is taken, and the wax model and pivots are invested together. After the casting, these pivots are removed from the inlay, leaving safety canals, which are filled with gutta-percha before the inlay is definitely seated in the cavity.

For gold crowns small platinum tubes are introduced into the root-canals, which are filled with gutta-percha, so that they come within about one and a half millimeter of the masticating surface. These tubes are likewise filled with gutta-percha, and held in place by a cement filling over which the crown is fitted. This simple method will appeal to the legion of operators who do not consider themselves infallible in preventing post-operative accidents in cases of caries of the fourth degree. With screw burs it will be easy to remove the gutta-percha from the artificial and the natural canals, and to disinfect by insufflation of oxygen charged with an appropriate medicament or to establish disinfectant drainage.

[*Revue Internationale de Prothèse Dentaire*,
Paris, October 1908.]

HEMOSTASIA IN DENTISTRY BY MEANS OF RUBBER PROSTHESIS. BY L. JOLY.

Hemorrhage in a patient with hemophilia is difficult to stop with medicaments; compression is sometimes difficult to apply, and the tampon is not practicable in many fields of operation. The application of caustics retards the cicatrization, and the physical depression and the moral effect of hemorrhage on the patient render the hemostatic properties of a rubber prosthesis doubly welcome. Whatever the nature of the dental operation be that produces hemorrhage, the vulcanite plate is constructed so as to cover the hemorrhagic field. In case of hemorrhage following extraction, if there are any neighboring teeth left, two 22-gage German silver wires are soldered in X form, and the ends are bent so as to embrace in hook form the remaining teeth. A pellet of softened dental wax is applied on the wire, placed in the mouth and fashioned with the finger under strong pressure so that a plate entirely cov-

ering the field of operation is secured. While this will afford temporary hemostasia, the bite is taken by asking the patient to close his teeth. In order to prevent him from biting on the hemorrhagic spot, a folded visiting card is interposed between the teeth. The assistant having prepared the plaster, the wax is invested and the rubber packed. After vulcanizing, the plate is finished and put to place. If greater pressure from the articulation is required, it will suffice to interpose several thicknesses of antiseptic gauze between the wound and the plate. The making of the apparatus, which, of course, is not as carefully executed as a permanent plate, should not take more than an hour and a half. In difficult cases it may be advisable to take an impression, which will act as a temporary hemostatic. It is imperative to take an impression if the hemorrhage is located in the palatal region, because for the sake of retention the plate must cover the entire surface of the vault. In one case of very serious hemorrhage after the removal of an abscess on the palate, due to an upper left lateral incisor, the author hit upon the idea of a rubber prosthesis after every other means of hemostasia had absolutely failed. Such palatal hemorrhages are very rare, yet the treatment suggested seems to be most rational, since it is impossible to have the patient keep his mouth open for several hours and tampon himself by holding his finger in his mouth. After having exhausted all other means of hemostasia the dentist should never hesitate to take recourse to the rubber prosthesis, for the time wasted in irresolution generally exceeds that necessary for the making of the apparatus, and the operator will be amply repaid by seeing his patient out of danger.

[*Archiv für Zahnheilkunde*, Charlottenburg,
December 1908.]

AMALGAM AND ITS SUCCESSFUL MANIPULATION. BY F. A. BROSIUS, D.D.S.

Amalgam nowadays is the most generally applied, but also the most decried filling material. It is most profusely condemned by those who pretend to use gold and porcelain exclusively and by those who have been very successful with its application but observe daily how the bulk of practitioners do not correctly mix and insert this material.

The main condition for success lies in the correct choice of the brand of material and its correct mixture and introduction into the cavity. The best results the author claims to have obtained from True Dentalloy. Every cavity is to be prepared with the same care as if it were intended for a gold filling. In approximal cavities the buccal and lingual walls, for the sake of extension for prevention of the progress of caries, are shaped so that when filled they can be freely washed by the saliva. The filling is to be firmly anchored in the masticating surface, the cervical border is extended below the gingivæ and should run at a right angle, with a fine curve, to the bucco-lingual walls. The latter should be smoothed with finishing burs or carborundum stones so that the amalgam receives a sharp line of demarkation. The space necessary for building up the contour should be procured by a gutta-percha filling or some other means of separation. The Darby separators are especially indicated on account of their prompt action. Most patients are willing to tolerate the unpleasant pressure; if they be too sensitive, a small injection of adrenalin, eusemin, etc., in the buccal, labial, or lingual region will render the separation almost unperceivable. Separation is necessary if we would reproduce the natural shape of the tooth and the correct point of contact with the approximal tooth, so important for the prophylactic effect of the filling, which cannot be obtained with a matrix only. True Dentalloy is mixed by the author by energetically grinding it in a mortar and adding enough mercury to render the mass plastic and to give the typical "tin cry" upon working it in the palm of the hand. If too much mercury has been added, Dr. Brosius prefers to add some more powder rather than to press out the mercury. He never inserts the filling without an assistant, for success rests upon the correct plastic state of the material, which can only be maintained by continued mixing. As the assistant hands over small or large conical or spherical pieces upon the amalgam holder, each one is worked into the cavity, whereby in a short time without any matrix even very large corners can be built up. The amalgam will rapidly acquire a certain hardness which will permit of a preliminary smoothing and polishing. All excess is removed with the spatula, silk thread, cotton, and strips before the final pol-

ishing. If the tooth had to be separated with the separator, some gutta-percha or linen cloth is laid in in order to secure ample space for the final polish. Success depends partly upon a high polish; the material will grow dull after some time, but it will never become dark. To avoid thermal shock and to firmly anchor the filling the amalgam is put in on soft cement. This much-discussed method will always prove advantageous, unless the places of anchorage have been poorly chosen and shaped, or the cement has not been worked to the right consistence; it surely serves better than any other material to strengthen a weak tooth. It has also been recommended to allow the cement to dry first, to secure new undercuts, and then to start with the filling. In some cases this may be found practical; generally, however, the amalgam adapts itself more closely to the soft cement, sticks firmly to it and increases the anchorage and the resistance to pressure.

[*Deutsche Zahnärztliche Wochenschrift*, Berlin, August 8, 1908.]

PERIODONTAL ANESTHESIA AND MANDIBULAR ANESTHESIA. By O. BORGS, EMMERICH.

The insufficiency of local anesthesia in the mandible has led to prolonged experiments with anesthetizing the mandibular nerve at its point of entrance. Nevertheless, many practitioners are not very successful with mandibular anesthesia, the reason lying in the defective instrumentarium which does not permit of a sufficient quantity of the anesthetic being injected in proximity of the point of entrance of the mandibular nerve. The breaking of injection needles in the muscles surrounding this nerve has discouraged many dentists. Owing to these drawbacks, the author has devised a method of injection which he terms periodontal injection. The instrument needed for this method consists in an absolutely tight syringe, one with a leather piston affording best service, three mouth-pieces specially constructed to reach all portions of the mouth, and the customary seamless cannulæ with short point. A 2 per cent. novocain solution in physiological sodium chlorid solution with the addition of 1 drop of synthetic suprarenin per 2 cubic centimeters of solution is injected. Both liquids can be preserved for an indefinite length of time and can be sterilized again by ebullition, the price

for one cubic centimeter being about one-fourth of a cent. If the solution be mixed by the practitioner himself, perfect guarantee of complete sterility and correct dosage is insured, which will do away with all untoward symptoms. Periodontal anesthesia is above all indicated in cases where no acute periodontitis is present. In the latter case mandibular anesthesia is advisable, also in cases where peculiar anatomical conditions prevent periodontal anesthesia, which are about five out of 100 cases.

The manipulation of periodontal anesthesia is as follows: The syringe fitted with the correct mouthpiece and needle is introduced into the mouth, and the needle is passed between the tooth to be anesthetized and the alveolus distally, the opening of the needle pointing toward the tooth. Then pressure is exerted upon the piston, and first slowly then faster, about 0.5 cubic centimeter of the fluid is injected into the periodontal membrane. The patient has a sensation of pressure which quickly leaves off as soon as sufficient anesthesia is reached. In the same way the periodontal membrane is saturated mesially with the fluid, one cubic centimeter sufficing in the majority of cases. Care must be taken not to inject into the gingivæ but into the periodontal membrane. If several molars are to be removed or treated, anesthesia is first introduced at the farthest distal tooth, the third molar; it will be communicated to the second and first molars. If in case of periodontitis one wishes to avoid mandibular

anesthesia, the more distal tooth may be anesthetized, whereby in most cases sufficient anesthesia will be obtained. Periodontal anesthesia is also applicable in many cases in the maxilla, especially in elderly persons and in teeth with thickened periodontium. Mandibular anesthesia is reserved for cases with difficult anatomical conditions or profuse swellings due to periodontitis or difficult dentition of the third molar. The great number of muscles found in the region of the rising branch of the mandible, and serving in the act of mastication and deglutition, easily misdirects the needle, which may be broken in the rather vigorous branch of muscles. To reach the point of entrance of the mandibular nerve with certainty, the linea obliqua interna of the mandible is palpated, which ascends from the coronoid process and branches out. At the point of this branching out, the needle is to be introduced at an angle of about 45° to the inner surface of the ascending branch, following the bone to a depth of about 15 millimeters, and 1½ cubic centimeters of a 2 per cent. solution of novocain are deposited, and distributed with the finger. After five minutes, perfect anesthesia is accomplished. Immediately after the injection the patient has a sensation of stiffness in the mandible, which is a sure sign that the injection has been made at the correct point. Mandibular anesthesia if executed correctly, together with periodontal anesthesia, will enable us to almost do away entirely with total anesthesia in dental practice.

PERISCOPE.

Method of Manipulating the Tooth-Brush.—After some years of experience I advise patients, after charging the brush, to begin with the lingual surfaces of the anterior teeth, and afterward brush the buccal surfaces of the molars, and then the upper and lower anterior teeth. After the brush, I advise silk charged with a paste made from the same tooth-powder. The method is recommended to avoid the friction caused from beginning with the upper lateral teeth.—A. CHIAVARO, *Dental Review*.

Enlarging Root-canals.—To enlarge a root-canal the dentin must be cut away. The shavings are supposed to be removed entirely by the frequent withdrawals of the drill, by the chip-blower, or the syringe. It is, however, not sure that some fine fragments of dentin will not be crowded against the foramen and create a source of infection. Every dentist would consider it criminal to commence enlarging a canal in order to prepare it for a pivot, before having closed the foramen either with gold, tin, cement or gutta-percha. No difference should be made between the method of proceeding with a narrow root and the preparation of an incisor for pivoting. For these reasons drilling into a narrow root-canal should be avoided.—WM. HIRSCHFELD, *Dental Review*.

The Control of Disinfectants.—We shall all agree that disinfectants should be tested under the same conditions, as far as possible, as those which obtain in practice; but surely if a stock dilution is to be examined for stability it should be tested at greater strengths than 1 per cent. No diluted emulsified disinfectant is absolutely stable, and the strength at which the solution is most stable may not be the same for each disinfectant. I could give instances of some emulsions that are quite satisfactory in 1 per cent. dilution, and yet throw out very heavily in 10 per cent. dilution, and some which are stable in 10 per cent. dilution and yet throw out in 1 per cent. dilution. It might be left to each maker to state the strength at which a stock solution gives most satisfactory results. In any case, I can think of few instances where a stock

solution should be prepared as weak as 1 per cent.

There is an enormous difference in the stability of different emulsions in different classes of waters, and unless water tests are made in both very hard and soft waters the results will have as little relation to the practical value of the disinfectant as the Rideal-Walker germicidal test on the naked organism has to the killing power of a disinfectant when the organism is associated, as it invariably is, with other forms of organic matter. The attempt to give one figure to indicate the value of a disinfectant under the varying conditions which must be met in practice is doomed to failure and leads to misrepresentations.—HENRY KENWOOD, *Lancet*.

Wiring Loose Teeth Together.—In wiring loose teeth together, instead of weaving a wire in and out around each tooth and then back in the same way, it will often be found easier and better to use a double wire, making one loop around all the teeth involved and twisting the ends together at a convenient place with pliers, but not drawing the loop tightly. Then take shorter bits of wire and make as many long staples as ties between the teeth are wanted. Push them from the inside outwardly, one leg of staple below the wire loop and the other above. Twist these ends with pliers, drawing the loop wires together, or toward each other between the teeth. This will tighten the loop and make it hug every tooth, holding loose teeth in line so firmly that they can scarcely be moved any more than the solid teeth, and may be so held for months. The twisted ends are cut off at a reasonable length and then bent over in between the teeth. Wired teeth of course, will catch some food particles, but this may be removed by thoroughly rinsing. Round wires around the teeth do not hold secretions as easily as flat bands, which usually cause decay after a few months or even a few weeks. No decay will occur on account of round wires if precautions are taken by flushing and sometimes picking out some of the collected food. Loose teeth held in this way for months and properly sealed and treated have often become firm and healthy again.—R. B. TULLER, *Amer. Dental Journal*.

Amount of Water for Vulcanizing.—One ounce of water is sufficient to put in the vulcanizer to vulcanize a set of teeth, and strange as it may appear, if the water is measured after vulcanization it will be a dram more in quantity.—*Dental Science*.

Root-canal Treatment.—More than one half of the pulp-canals treated become well in spite of the treatment and not owing to it. With regard to drilling out canals, personal experience leads to the thought that in certain cases, where it is possible and feasible, it is a wise procedure. In cases where it is not possible I rely upon thorough desiccation and flooding of the canals with formol, and vaporizing the formol with hot silver or copper wire. It is the vapor of formol that disinfects.—G. B. HAYES, *Dental Review*.

Alcohol for Cleansing the Field of Operation and Holding the Rubber Dam.—After placing the dam, always go over the surfaces of exposed teeth with a pledget of cotton saturated with alcohol, repeat this several times and dry with a blast of air. This has a double function. It cleanses the field of operation and removes the oleaginous materials from the surfaces of the teeth and prevents the rubber dam from slipping off. Indeed, so closely does the dam adhere to the teeth after the alcohol bath that it is almost impossible to get the dam off the teeth after the operation without tearing it. One of the nicest things that I have found for cleansing the teeth with the alcohol, and, in fact, for a great many purposes, are pledgets of cotton which my assistant prepares for me by cutting the smallest size Johnson & Johnson cotton rolls into pledgets that are about as long as their diameter.—J. V. CONZETT, *Dental Digest*.

Local Treatment of Acute Pericemental Inflammation.—This disturbance is due to pathogenic bacteria and their toxins. In the selection of remedial agents we must not only seek to inhibit and destroy the bacteria but to dispose of the irritating and poisonous gases resulting from the putrefaction of the pulp tissue. The first step is to adjust the rubber dam and sterilize the teeth included in the isolation. For this purpose nothing is more effective than a strong solution of bichlorid of mercury. This is followed by an alcohol bath. The pulp-chamber is then freely opened, but no attempt is made to remove the contents of the canal. A small pledget of cotton saturated with cresoform is placed in the pulp-chamber, and the cavity sealed with gutta-percha. This dressing may remain

for one or two days, when it is removed. The canal is then opened and the contents carefully removed, using for this purpose a 50 per cent. solution of sulfuric acid, worked in the canal by means of a Donaldson barbed broach. The canal is then dehydrated with alcohol and warm air, and dressed with a rope of cotton saturated with cresoform, and the cavity sealed. This dressing is allowed to remain for several days or a week, when it is removed and the canal further opened by means of a drill. It is then re-dressed and allowed to go for several days, when the tooth can be filled.

The end sought in this treatment is not only to remove and correct the cause of the disorder, but to induce a termination of the inflammation by resolution. When the disease has got beyond this stage, then it is necessary to institute a treatment which comes under the head of abscesses.—J. CLARENCE SALVAS, *Dentist's Magazine*.

Gingival Massage.—A majority of the thoughtful men practicing dentistry today would approve and recommend to their patients a systematic daily massage of the gingivæ, if a suitable instrument could be produced. There are certain dangers in the tooth-brush that we all recognize.

This massage would be recommended for its effect upon the capillary circulation in the soft tissues in the gum and in the pericemental membrane. The physiological hyperemia caused by the rubbing or percussion would be followed by a more active exudation of nutritive fluids through the capillary walls.

The living cells of the parts would undergo more active metabolism. The excretion of waste and other products of metabolism would be more readily delivered from the tissues, and a higher and more normal vitality than is to be found in the gum tissues of the average civilized man of today would follow.

This would mean to him healthy oral secretions, greater power of resistance on the part of the mucous cells to deleterious substances and products of fermentations, which are ever present in the mouth, and a firmer support to the teeth themselves.

Systematic massage will so exercise and strengthen the gums that they will be able to attain and maintain the maximum of healthy gum function; the mucous cells will exert their protective influence by the secretion of healthy mucus instead of the pseudo-mucus described by Dr. George W. Cook of Chicago; the pericemental tissue will be firmer and more resistant to injuries—tartar, bands, etc.

—and infections; the serumal deposits will be hindered, and finally a generally marked improvement in the tone of the tissues of the oral cavity will be observed after massage.

Massage is a prophylactic measure of infinite value to local—hard and soft—tissue and against a number of constitutional or remote diseases of which oral sepsis is believed to be a potent etiological factor—septic gastritis, toxic neuritis, and other septic conditions of the organism. (Hunter.)
—C. M. WRIGHT, *Dental Review*.

All-Gold Crowns for Bridges.—Take a diatoric tooth and fill up the middle hole with wax, into which insert the point of some sharp instrument. Next melt some wax in a test tube and then dip the tooth into the wax until it is of the thickness which the gold is required to have. Then cut away the wax from the base of the tooth and take out the wax from the hole, leaving the rest of the tooth entirely covered with a thin layer of wax. From this point the crown undergoes the ordinary routine followed in the use of Solbrig's pliers, or any of the other methods now adopted for making gold inlays. The result is a gold crown, solid in form, of perfect shape, and in which a minimum amount of gold has been used.—PERCY S. STOKES, *British Dental Journal*.

Oral Prophylaxis.—Oral prophylaxis is that branch of dentistry which has for its object the reclaiming of the oral tissues to a state of health, and preserving them in this condition by increasing their resistance against hurtful influences, and by anticipating and removing the cause of disease in them.

Repeat your instructions until your patient understands them.

An astringent mouth-wash is indispensable during the curative treatment.

Lactic and other acids in medicaments should be used cautiously, if at all, since they are apt to irritate the cementum and dentin where the latter is exposed.

Prevention is better than cure.

Repair work is still necessary, but set your ideal above it.

Orthodontists are the nearest kin to the oral prophylaxis specialists.

Potassium iodid and iodine crystals, 19 gr. of each in 4 oz. of H_2O , equals Ferris' solution. This will stain the coatings on the teeth without injury to the gum tissue.

Hurry makes waste, and time in oral prophylaxis is as essential as proper instruments are.

Your patients may at first object to using dental floss, but when they realize that it is

absolutely necessary and understand its application, they will willingly use it.

Leave nothing to a patient's imagination or ingenuity, but give your directions in detail.

Anesthetics are seldom necessary if the operator is skilful and is using proper scalers.

Xantippe-like, we must scold if our patients neglect to carry out our instructions; that is our privilege.

If you cannot cure pyorrhea, you can prevent it.

Study each case until you have decided what brushes are best fitted for each mouth.

—GRACE PEARL ROGERS, *Dental Summary*.

Metallic Fillings in Cement-Lined Cavities.—In mesial approximal cavities, after the cavity is prepared, which should be done in the same manner as for gold alone, including if possible the usual undercuts, have the cement on the slab ready and the instruments in place; then anneal the gold and have it ready. If the dentin has been desiccated with hot-air blasts it is impossible to get the proper adhesion of cement when flowed over the irregularities of the cavity walls; there will be a tendency to bridge across this uneven surface when the cement is of the usual consistence, therefore it is advisable to moisten this surface with the liquid of the cement in order to displace all air in these places, after which all visible surplus of the liquid should be removed. This is just as important as the moistening of the surface of plaster where we desire to pour more plaster on it. By this means we get a knitting of the particles of cement into the tubuli of the dentin. The cement is mixed to a thin plaster, and with some suitable instrument, such as a small excavator or canal plugger, a small quantity is inserted, then more, until there is sufficient to cover the walls by gently working it over them.

Then, with preciseness and haste without any loss of time—for a second lost may prove a failure—insert a mat of crystal gold, pressing it gently over the cavity, squeezing out some cement, and with corkscrew pluggers press the undercuts as if there were no cement, trying to remove as much of the soft cement as possible, for it is better to depend on some undercuts for retention rather than solely rely on cement, while at the same time the cement does its part; for I have never had a filling to rock or become loose in building by this method. When the first mat is properly placed, add more gold, even if the cement has not fully crystallized, but use very little

pressure. Usually by that time the cement will be hard, and the operator can proceed to build up the filling. If there is any excess of cement over the margins it can be chipped away, so as to have a clean margin. This can be easily done with a Black's knife. The filling is then finished and well burnished, and after all the excess of filling material is removed, and the filling is polished to a certain degree, it should be burnished about the margins again to insure a perfect adaptation at this point.—F. S. OSBORN, *Dental Brief*.

Treating and Filling Putrescent Root-Canals.—When canals are ready to be filled and all preliminary steps are taken, a thread of cotton wrapped around a smooth broach is dipped into tincture of iodine, then into finely powdered tannic acid, and forced to the apical end of the root-canal; after drying the canal thoroughly so that all excess of iodine is removed, wipe it out with alcohol, and it is ready for the filling. I use oxide of zinc mixed with one-fourth of one per cent. formalin in beechwood creasote to the consistence of a thick cream, and by means of a thread of cotton on a fine broach force it to the end of the root, using care not to force it through the apical foramen. Repeat until the canal is well filled, then insert gutta-percha points.

With this material sepsis will not recur, as you have a material that sets as hard as cement, seals the apical foramen perfectly and is antiseptic and germ-proof.—T. C. REID, *Dental Summary*.

Method of Speedily Constructing a Temporary Partial Denture.—Occasionally one is called upon to supply at extremely short notice an artificial tooth in the front of the mouth, owing to some accident having happened at a time most inconvenient for the patient. No doubt there are many ways in which this could be done, but having for some time used the Jackson system of regulating, the following method suggested itself as a very easy and rapid one. In one case the right lateral had to be supplied and barely three-quarters of an hour was the time limit. The model being produced, backings of thin German silver were quickly contoured with contouring pliers to fit the lingual surfaces of the two bicuspid, canine and part of the central on the right side. The backings on the bicuspid were made to fit very accurately at the neck of the tooth, and curved sufficiently over the prominences toward the grinding surface to prevent the denture, when in place, from pressing on the soft tissues. A suitable gauge of gold-cased wire was then

bent so as to fit closely to the neck of the sound bicuspid labially, and its free ends bent so as to cause them to pass over the occlusal surface at the junction with the adjoining teeth, and to fold over the backing and meet almost at the gum line. This formed the spring clasp. A suitable pin tooth was then fitted and backed with German silver plate, the pins being bent over this. All the parts being ready, the backings were first put in position on the plaster model, then the spring clasp. This latter was held in place by a small lump of molding, and the tooth being put into place was retained there and the facing protected by the same means. The parts were then well fluxed with zinc chloride solution, and small pieces of jeweler's fine soft solder placed upon them. A light touch with a properly heated soldering bolt was sufficient to cause the solder to flow over and unite all the parts and very little polishing was necessary to produce a very acceptable appliance which was held very firmly in position. The whole procedure was carried out within the time stated.—W. A. HARROP, *Dental Record*.

Bismuth Paste in the Treatment of Pyorrhea Alveolaris and Sinuses of the Jaws.—(1) The injection of a 33 per cent. bismuth-vaseline paste into the pockets of pyorrhea alveolaris is a remedy far superior to any heretofore employed.

(2) The same paste injected into fistulae of chronic alveolar abscesses, or sinuses of the jaws, produces a rapid closure of the same, provided every recess of the sinus has been reached, and no sequestra are present. Tubercular sinuses are not excepted.

(3) The secretions of the sinuses change their character after injection; they become serous, and micro-organisms gradually diminish and finally disappear.

(4) Bismuth subnitrate is a bactericidal and chemotactic substance, which is slowly absorbed and slowly eliminated.

(5) By its retention in pus pockets and by not being acted upon by the saliva, it prevents further infection and decomposition.

(6) No serious complications are to be anticipated, since 100 grams of the paste are rarely used. In larger doses it may produce symptoms of ulcerative stomatitis, with black borders around the gums.

(7) As a dressing in cavities, it is preferable to any other, inasmuch as it promotes healing of chronic suppuration and rapid formation of granulations.

(8) Other treatment (prophylaxis) in connection with the bismuth paste is necessary.—RUDOLPH BECK, *Dental Review*.

Neuralgia Minor Produced by Diseases of the Ear.—Pain from a lower tooth not infrequently produces earache, and, in some cases, the symptoms of the offending tooth are so slight that they are overlooked by both the patient and the surgeon. Cases are on record where the membrana tympani had been punctured for the relief of earache that was subsequently proved to be a referred pain from a tooth.—WM. MATTHEWS, *Dental Record*.

A Method of Repairing a "Window" Crown.—The ends of the pins of the original facing are cut off and ground down flush with the backing. A horizontal slot is then cut in the backing and cement, of a sufficient width and depth to allow of the insertion of the straight pins of a new facing. A narrow strip of metal is then soldered to the free ends of the pins and the facing ground to fit into place. It may then be easily cemented into position and forms a very effective repair.—J. D. BROWNLIE, *Dental Record*.

Neuralgia Minor Caused by Periodontitis or Alveolar Abscess.—Generally speaking, a dead tooth does not cause referred pains. The pain in these cases is almost always local in and around the tooth causing the trouble. The pain here generally subsides as the face begins to swell. This is because the pus formed at the apex of the root has found its way through the alveolar process into the submucous tissues where it meets with less resistance, and the abscess sac is enabled to swell more freely and the pressure on it is lessened.

Neuralgic pains may arise from an abscessed tooth in three ways:—First, when part of the nerve is still living. Second, when branches of the nerve (not nerve endings) to the pulp are involved in the inflamed area. Third, when the trunk of the dental nerve is involved or is being encroached upon by the inflammation, as illustrated by the severe neuralgic pains which follow the extraction of lower third molars.—WM. MATTHEWS, *Dental Record*.

HINTS, QUERIES, AND COMMENTS.

HOLLOW CAST INLAYS.

In making a hollow cast inlay after the wax model is on the sprue, build up the investment on the sprue side and let it harden; then, with a small drill in the engine, drill out the back of the wax to the extent of the cavity wanted in the back of the inlay, and finish the investment.

The first investment holds the wax firmly. The drill is better than a lancet for cutting the wax. Particles of wax can be brushed away with a very fine brush.

A hollow inlay is more firmly held by the cement, and less gold is used.

WILL S. PAYSON.

Castine, Me.

end toward a point. Have several sizes of shot at hand, and at each drawing use a size that nearly fills the shell.

FREDERICK H. BROWN.

Lebanon, N. H.

SILVER FILLING LASTING FIFTY-FIVE YEARS.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—Can any of the dental profession give a better record of the endurance of a silver filling than this?

Mrs. Sarah Conforth of Fairfield, Me., seventy-one years of age, has a silver filling that was inserted by Dr. W. H. Stevens of New Portland, Me., in her upper left canine at the age of sixteen, thus covering a period of about fifty-five years of constant wear. The tooth is still in a very good state of preservation.

E. H. KIDDER.

Waterville, Me.

A CROWN-SWAGING HINT.

To swage a gold shell to approximate the shape of a canine, drop a large shot into the shell the last one or two times through the die-plate, which will uniformly stretch the

OBITUARY.

DR. ALISON WRIGHT HARLAN.

DIED, in New York, Saturday, March 6, 1909, from hernia and complications resulting from an accidental fall, ALISON WRIGHT HARLAN, A.M., D.D.S., M.D.

Dr. Harlan was born in Indianapolis, Ind., on November 15, 1851. He was the son of Austin B. and Elizabeth L. Harlan. He received his early education in the public schools of his native state. From 1867 to 1869 he studied dentistry in the office of Kilgore and Helms of Indianapolis, and began the practice of dentistry in Chicago, Ill., in 1869. He was afterward graduated from the Ohio College of Dental Surgery in 1880, and from the Rush Medical College of Chicago, with the degree of Doctor of Medicine. His degree of Master of Arts was received from Dartmouth College.

Dr. Harlan, besides attaining prominence as a progressive and active practitioner of dentistry and acquiring a lucrative practice, was intensely interested in all of the activities which pertain to the progress and development of his chosen profession, and became an important factor in the educational, literary, legislative, and scientific departments of professional work. He was one of the founders of the Chicago College of Dental Surgery, and professor of materia medica and therapeutics in that institution from its foundation in 1883 until 1904. He was professor of dental surgery at the College of Physicians and Surgeons of Chicago, and was also connected in a teaching capacity with Rush Medical College. He was one of the founders of the *Dental Review*, and its editor from 1887 until 1902, and a member of the first Board of Dental Examiners for the State of Illinois.

His broad grasp of the activities and general trend of affairs in his profession and his abilities as a leader qualified him for effective service in connection with the larger organizations of dentistry, and when the World's Columbian Congress, the second in the list of international dental congresses

and the first to be held in America, was in process of development, Dr. Harlan's abilities were sought by his colleagues in the organization of that movement, and he was made secretary-general of that great convention in 1893. He was one of the delegates representing the government of the United States to the Third International Dental Congress held in Paris in 1900. He was a national delegate to the Odontological Section of the Medical Congress held in Madrid in 1903, and a national delegate to the Fourth International Dental Congress held in St. Louis in 1904.

He was one of the organizers and original members of the International Dental Federation, which was created at the Paris congress of 1900, and attended each of its succeeding annual meetings in various parts of Europe and in America. It was his intention to attend the coming Fifth International Dental Congress in Berlin.

Dr. Harlan was a prolific writer, his communications relating more particularly to the questions of pathology, materia medica, and therapeutics. Many new therapeutic methods and the introduction of a variety of new drugs and pharmaceutical preparations are due to his keen interest in the study of these departments of dental practice. Dr. Harlan's papers were characterized by careful investigation and a thorough familiarity with the literature of the subjects upon which he wrote. As a teacher he was careful and thorough, and his conclusions were always ably defended by him in debate, supported as they were by mastery of his subject.

His interest in the society work of the dental profession was perennially active, and to the limit of his capacity he was always willing to contribute either by a formal essay or by clinical demonstration to the work of any society within his reach. That he received grateful recognition for his services is evinced by the fact of his membership in such a large number of dental societies both of his native land and abroad. Among the many societies of which he was a member may be mentioned

the following: The Dental Society of the State of New York, the Odontological Society of New York, the First District Dental Society of New York, the Chicago Odontological Society, of which he was one of the founders, the Chicago Odontographic Society, the Chicago Dental Society, the National Dental Association, the Central Dental Association of Northern New Jersey, the Society of Dental Science of St. Louis, Mo., the Illinois State Dental Society, the International Dental Federation, the American Dental Society of Europe, the American Medical Association, the Delta Sigma Delta Dental Fraternity, and the Interstate Dental Fraternity. He was a member of the Illinois Society of New York, the Indiana Society of New York, the Manhattan Club, the New York Athletic Club, Siwanoy Club of Mt. Vernon, New York, and of the B. P. O. Elks, No. 4, Chicago.

Dr. Harlan was twice married. His first marriage was to Elizabeth M. Muirson of Illinois in 1870, and his second marriage to Mary E. Gallup in New York in 1902. His wife and a family of grown children survive him. On March 9, 1909, his remains were placed in the vault of Kensico cemetery, New York.

DR. J. B. ASKEW, Sr.

DIED, at his home in Vicksburg, Miss., on Wednesday, March 3, 1909, Dr. J. B. ASKEW, Sr.

With the death of Dr. Askew, which occurred on March 3, 1909, at his home in Vicksburg, Miss., the dental profession loses a prominent and highly esteemed member.

After serving his years of apprenticeship, Dr. Askew attended the Ohio College of Dental Surgery during the session of 1868-69. After being graduated he located at Vicksburg, where he practiced dentistry until 1900, when he was forced to retire on account of failing eyesight. He had a large *clientèle*, and enjoyed the respect of the community as a prominent and useful citizen and the reputation of a very skilful dentist. He was one of the organizers of the Mississippi State Dental Association, and presided at the merging of that organization in the Mississippi Dental Society in 1894. Dr. Askew was president of both these bodies, and was an hon-

orary member of the Mississippi Dental Association at the time of his death. He was also an ex-member of the Mississippi Board of Dental Examiners.

Dr. Askew's services were freely given to the promotion of professional interests, and his untiring efforts earned for him the highest appreciation of all his clients and *confrères*. He was succeeded in his practice by his son, Dr. J. B. Askew, Jr., who was associated with him for several years before he retired.

DR. W. H. DORRANCE.

DIED, January 22, 1909, at his home, 700 South Ingalls st., Ann Arbor, Mich., WILLIAM HENRY DORRANCE, D.D.S., in the sixty-seventh year of his age.

The termination of the life of Dr. Dorrance, which came after a lingering illness at his home in Ann Arbor, is an event which will be noted throughout the dental world.

William Henry Dorrance was born August 29, 1842, in Albion, Orleans county, New York, and there he received his early education. After being graduated from Albion Academy he took up the study of dentistry in the dental office of Phillips and Straight in Albion, without having at that time any intention to follow the profession. Continuing in this line of work until the outbreak of the civil war, he felt constrained to enlist. He served the cause of the Union faithfully under General McClellan's command, taking part in the battles from Bull Run to Antietam, and was discharged, after serious illness, in 1863. Sometime later he settled in Jackson, Mich., where he began the practice of dentistry. In 1877 he was appointed demonstrator in the College of Dental Surgery, Ann Arbor, to succeed Dr. W. H. Jackson. Two years later he was promoted to full professorship with the title of professor of prosthetic dentistry and metallurgy. He was a member of the State Dental Association, which in 1875 was instrumental in organizing the Michigan Dental College, and was president of the association at the time when the college was reorganized and made an integral part of the University of Michigan. His degree of Doctor of Dental Surgery was taken in 1879. After serving the college with marked success and distinction for twenty-five

years, he severed his connection with the university in 1902.

Dr. Dorrance was married in 1867 to Miss Clara E. Baldwin of New York, who survives him, together with two children, William H., a mechanical engineer of Detroit, Mich., and Susan Juliet, now Mrs. Robert M. Fox of Detroit, Mich. Another son, Wendell Baldwin, died in 1887.

Dr. Dorrance was a member of the Washtenaw Medical Society, the Michigan Medical Society, the Detroit Dental Society, and the Michigan Dental Society, being honored with the presidency of some of the latter societies at different periods. At the last meeting of the First District Dental Society of Michigan he was made honorary member for life. He was also a charter member of the Delta Sigma Delta Fraternity. He was a prominent Mason, having gained his thirty-second degree, and was past master of Fraternity Lodge, No. 262. He was a member of the Royal Arcanum, the A. O. U. W., and the G. A. R.

The history of the latter half of Dr. Dorrance's life is inseparably connected with the history of the founding and development of the dental department of the University of Michigan. Equipped with a remarkably penetrating and subtle intellect, combined with the highest mechanical skill, he was enabled to achieve a position of highest eminence in his profession. Intensely devoted to his science, he was ever happy in the exercise of his extraordinary powers in his private laboratory and in the discharge of his duties in the classroom. The results of his untiring studies contributed to the advancement of dental science; but also metallurgy and medical surgery profited by his inventive genius. From his investigations there issued his comprehensive work on prosthetic dentistry and also numerous valuable essays on dental subjects,

which were read at dental conventions and published in various dental journals. Few dental conventions were held during his university career of twenty-five years in which Dr. Dorrance did not serve and command admiration as a most skilful demonstrator. Hundreds of graduates unanimously testify to his intrinsic worth, distinguished abilities, and charming qualities as a lecturer and demonstrator. He invariably aroused interest in his special subject, and in giving instruction stimulated the student to put forth his best efforts for the acquirement of the knowledge and skill necessary for a successful career in the dental profession. His many acts of kindly encouragement will never be forgotten.

Endowed with an exquisite delicacy of soul, true nobility of heart, and superior qualities of mind, the charm of Dr. Dorrance's personality seldom failed to win the admiration, esteem, and love of all with whom he had intercourse. Socially he was distinguished by refined delicacy and culture, which gained him the true friendship of many. Of the wealth of his professional knowledge and experience he gave freely; he was generous to a fault. His highly artistic temperament manifested itself in all his productions, many of which were of a non-professional character. He engraved beautifully. Every product of his deft fingers bore the evidences of a most delicate touch and revealed the natural and educated artist. He was a student and lover of music, playing several instruments. He was also a successful choir director, having served in this capacity in the Baptist churches of Jackson and Ann Arbor.

Dr. Dorrance was a member of the Baptist Church, in which connection he faithfully served in many honored capacities at various periods of his life.

Interment was made in Forest Hill cemetery.

SOCIETY NOTES AND ANNOUNCEMENTS.

DENTAL SOCIETY MEETINGS.

N. D. A. MEETING.

NATIONAL DENTAL ASSOCIATION. Birmingham, Ala. Four days: March 30th to April 2d.

INTERSTATE DENTAL FRATERNITY. Birmingham, Ala. During the N. D. A. meeting.

April, May, and June.

APRIL.

AMERICAN DENTAL SOCIETY OF EUROPE. Wiesbaden, Ger. Three days: April 9th, 10th, and 12th.

CONNECTICUT STATE DENTAL ASSOCIATION. Waterbury. Two days: April 20th and 21st.

EASTERN KENTUCKY DENTAL ASSOCIATION. Ashland. April 3d.

FIFTH DISTRICT (N. Y.) DENTAL SOCIETY. Syracuse. Two days: April 9th and 10th.

LOUISIANA STATE DENTAL SOCIETY. New Orleans. Three days: April 28th to 30th.

THIRD DISTRICT (N. Y.) DENTAL SOCIETY. Albany. April 20th.

MAY.

ALABAMA DENTAL ASSOCIATION. Anniston. Three days: May 11th to 13th.

ARKANSAS DENTAL ASSOCIATION. Hot Springs. Three days: May 26th to 28th.

EASTERN INDIANA DENTAL ASSOCIATION. Marion. Two days: May 5th and 6th.

ILLINOIS STATE DENTAL SOCIETY. Danville. Four days: May 11th to 14th.

IOWA STATE DENTAL SOCIETY. Des Moines. Three days: May 4th to 6th.

KENTUCKY STATE DENTAL ASSOCIATION. Crab Orchard Springs. Three days: May 17th to 19th.

LAKE ERIE (Pa.) DENTAL ASSOCIATION. Cambridge Springs. Three days: May 18th to 20th.

LEBANON VALLEY (Pa.) DENTAL ASSOCIATION. Reading. May 11th and 12th.

MISSISSIPPI DENTAL ASSOCIATION. Natchez. Three days: May 11th to 13th.

MISSOURI STATE DENTAL ASSOCIATION. Kansas City. Three days: May 26th to 28th.

NEBRASKA STATE DENTAL SOCIETY. Lincoln. Three days: May 18th to 20th.

NEW HAMPSHIRE AND VERMONT STATE DENTAL SOCIETIES. Weirs, N. H. Four days: May 18th to 21st.

NEW YORK STATE DENTAL SOCIETY. Albany. Three days: May 6th to 8th.

SUSQUEHANNA (Pa.) DENTAL ASSOCIATION. Harvey's Lake. May 18th to 20th.

TENNESSEE STATE DENTAL ASSOCIATION. Memphis. Three days: May 25th to 27th.

VERMONT STATE DENTAL SOCIETY. [See NEW HAMPSHIRE.]

JUNE.

AMERICAN MEDICAL ASSOCIATION, SECTION ON STOMATOLOGY. Atlantic City, N. J. Four days: June 8th to 11th.

COLORADO STATE DENTAL ASSOCIATION. Colorado Springs. June 17th.

FLORIDA STATE DENTAL SOCIETY. Ocala. Three days: June 17th to 19th.

INDIANA STATE DENTAL ASSOCIATION. Indianapolis. June 29th to July 1st.

MAINE DENTAL SOCIETY. Portland. Three days: June 24th to 26th.

MASSACHUSETTS DENTAL SOCIETY. Boston. Three days: June 9th to 11th.

MICHIGAN STATE DENTAL SOCIETY. Kalamazoo. Three days: June 29th to July 1st.

MINNESOTA STATE DENTAL ASSOCIATION. Minneapolis. Three days: June 22d to 24th.

NEW MEXICO DENTAL SOCIETY. Albuquerque. Two days: June 17th and 18th.

NORTH CAROLINA DENTAL SOCIETY. Asheville. Four days: June 23d to 26th.

OKLAHOMA STATE DENTAL SOCIETY. Oklahoma City. Three days: June 3d to 5th.

SOUTHERN CALIFORNIA DENTAL ASSOCIATION. Los Angeles. June 28th to 30th.

SOUTHERN WISCONSIN DENTAL ASSOCIATION. Beloit. Two days: June 3d and 4th.

TEXAS STATE DENTAL ASSOCIATION. Waco. Three days: June 10th to 12th.

VIRGINIA STATE DENTAL ASSOCIATION. Chase City. Three days: June 21st to 23d.

Examiners' Meetings.

ALABAMA BOARD OF EXAMINERS. Anniston. May 10th.

ARKANSAS BOARD OF EXAMINERS. Hot Springs. May 24th and 25th.

CONNECTICUT BOARD OF COMMISSIONERS.
Hartford. June 24th to 26th.

ILLINOIS BOARD OF EXAMINERS. Chicago.
June 10th.

KENTUCKY BOARD OF EXAMINERS. Louisville. June 1st.

MARYLAND BOARD OF EXAMINERS. Baltimore. May 26th to 28th.

MICHIGAN BOARD OF EXAMINERS. Ann Arbor. June 14th.

NEW HAMPSHIRE BOARD OF REGISTRATION. Manchester. June 1st to 3d.

NEW JERSEY BOARD OF REGISTRATION. Trenton. July 6th to 8th.

PENNSYLVANIA BOARD OF EXAMINERS. Philadelphia and Pittsburg. June 9th to 12th.

RHODE ISLAND BOARD OF REGISTRATION. Providence. June 22d to 24th.

TENNESSEE BOARD OF EXAMINERS. Nashville. May 18th to 21st.

TEXAS BOARD OF EXAMINERS. Waco. June 14th.

W. D. MILLER CLUB.

BERLIN, GERMANY.

At the annual general meeting of the W. D. Miller Club the following officers were elected for the ensuing year: C. H. Abbot, president; H. Boedecker, vice-president; E. Lawley-York, secretary-treasurer.

E. LAWLEY-YORK,
Königgrätzerstrasse 140, Berlin, W.

AMERICAN DENTAL SOCIETY OF EUROPE.

THE thirty-sixth annual meeting of the American Dental Society of Europe will be held in Wiesbaden, Germany, on April 9, 10, and 12, 1909. An interesting program is already assured. A most cordial invitation is extended to members of the profession.

T. G. PATTERSON, *Hon. Sec'y*,
2 Quai des Eaux Vives, Geneva, Switzerland.

INTERSTATE DENTAL FRATERNITY.

THE annual meeting of the Interstate Dental Fraternity of the United States and Canada will be held at Birmingham, Ala., during the meeting of the American Dental Association. The meeting will be in charge of Dr. R. H. Welsh, secretary of the I. D. F. for Louisiana. R. M. SANGER, *Nat'l Sec'y*.

NATIONAL DENTAL ASSOCIATION.

Birmingham, Ala., March 30 to April 2.

THE thirteenth annual meeting of the National Dental Association will be held in Birmingham, Ala., March 30 and 31 and April 1 and 2, 1909. All meetings of the association, sections, and clinics will be held in the City Hall, at the corner of Fourth ave. and 19th st. The headquarters of the association will be at Hotel Hillman, directly opposite the City Hall. Reservations should be made through the chairman of the Local Committee of Arrangements, Dr. J. A. Hall.

All preparations for the meeting are well advanced, and a large attendance is assured.

V. E. TURNER, *President*,
Raleigh, N. C.
CHAS S. BUTLER, *Sec'y*,
Buffalo, N. Y.

Organization of Sections.

SECTION I.

Prosthetic Dentistry, Crown and Bridge Work, Orthodontia, Metallurgy, Chemistry, and Allied Subjects.

HARRY E. KELSEY, *Chairman*, Commonwealth Bank Bldg., Baltimore, Md.

H. H. JOHNSON, *Vice-chairman*, 306 Second st., Macon, Ga.

J. S. SPURGEON, *Secretary*, Hillsboro, N. C.

SECTION II.

Operative Dentistry, Nomenclature, Literature, Dental Education, and Allied Subjects.

W. G. EBERSOLE, *Chairman*, 800 Schofield Bldg., Cleveland, Ohio.

R. H. WALKER, *Vice-chairman*, 231 Main st., Norfolk, Va.

L. L. BARBER, *Secretary*, 311 Summit ave., Toledo, Ohio.

SECTION III.

Oral Surgery, Anatomy, Physiology, Histology, Pathology, Etiology, Hygiene, Prophylaxis, Materia Medica, and Allied Subjects.

C. C. ALLEN, *Chairman*, Rialto Bldg., Kansas City, Mo.

J. E. CHACE, *Vice-chairman*, Ocala, Fla.

J. W. HULL, *Secretary*, Altman Bldg., Kansas City, Mo.

PROGRAM.**General Session.**

JAMES McMANUS, D.D.S., Hartford, Conn. "A Sidelight on Professional Interest."

Discussion by J. Y. Crawford, Nashville, Tenn.

EDWARD C. KIRK, D.D.S., ScD., Philadelphia, Pa. "The Dental Relationships of Arthritis."

L. G. NOEL, D.D.S., Nashville, Tenn. "The Management of the Mouths of Young People from the Age of Six to Adolescence."

Discussion by T. P. Hinman, Atlanta, Ga.

Voluntary essay: W. STORER HOW, D.D.S., Philadelphia, Pa. "Doctor of Dental Science."

Section I.

MARTIN DEWEY, Kansas City, Mo. "Development of the Face."

Discussion by Richard Summa, F. B. Noyes, Calvin S. Case, W. O. Talbot, C. A. Hawley, and F. C. Wilson.

H. H. JOHNSON, Macon, Ga. "Crown and Bridge Work."

Discussion by H. T. Stewart, T. P. Hinman, C. L. Alexander, Gordon White, and Carroll H. Frink.

CLARENCE J. GRIEVES, Baltimore, Md. "The Behavior of Certain Metals in the Mouth."

Discussion by Joseph Head, B. Holly Smith, J. E. Chace, and H. R. Jewett.

GEORGE H. WILSON, Cleveland, Ohio. "The Principles of Retention of Artificial Dentures."

Discussion by S. L. Rich, Wm. B. Finney, F. W. Stiff, A. J. Cottrell, and N. C. Leonard.

Section II.

S. D. RUGGLES, Portsmouth, Ohio. "Phases of Importance in Nomenclature."

Discussion by W. G. Mason and H. T. Smith.

GEORGE S. VANN, Gadsden, Ala. "Dental Science a Part of Universal Literature."

Discussion by F. L. Hunt and B. L. Thorpe.

W. T. JACKMAN, Cleveland, Ohio. "The Elimination of Fear in the Practice of Dentistry."

Discussion by M. L. Rhein, J. Y. Crawford, and W. G. Ebersole.

HERBERT L. WHEELER, New York city. "Education of the Dental Student Concerning Preventive Dentistry."

Discussion by Chas. S. Butler and G. M. Smith.

J. R. CALLAHAN, Cincinnati, Ohio. "Operative Dentistry—Root-canal Treatment."

Discussion by J. C. Watkins, A. H. Peck, and J. D. Patterson.

Section III.

A. H. THOMPSON, Topeka, Kans. "The Evolution of Tools."

Discussion by L. C. Noel and G. V. I. Brown.

LEVI C. TAYLOR, Hartford, Conn. "Dentistry Past and Present as Seen by a Modern Hygienist."

Discussion by N. S. Hoff, A. C. Fones, and J. Y. Crawford.

GORDON WHITE, Nashville, Tenn. "Something on Pyorrhea."

Discussion by J. D. Patterson, J. C. Hartzell, and J. D. Towner.

A. W. HARLAN, New York city. "Friction as an Aid to Restoration of Gum Tissue."

Discussion by H. H. Johnson, H. W. Gillett, and Geo. E. Eubank.

TRUMAN W. BROPHY, Chicago, Ill. "Recent Progress in Oral Surgery."

Discussion by J. D. Patterson and T. P. Hinman.

Clinics.*Table Clinics.*

1. HENRY BANCZOF, Milwaukee, Wis. "Something in the Cast-Gold Inlay Line."

2. A. P. BURKHART, Buffalo, N. Y. "Double Inlay System; also Combination of Vulcanite and Metal in Crown and Bridge Work."

3. H. E. BELDEN, New Orleans, La. "Jack-screws for Regulating."

4. L. T. CANFIELD, Toledo, Ohio. "Aseptic Methods and Materials in the Treatment and Filling of Root-canals."

5. J. C. CHISHOLM, Selma, Ala. "A Crown and a Bridge."

6. J. P. CORLEY, Greensboro, Ala. "Steele's Interchangeable Facings."

7. E. P. DAMERON, St. Louis, Mo. (To be announced.)

8. H. M. DAVIDSON, Hubbard City, Texas. "Gold Inlay Cast Fillings."

9. JOS D. EBY, Atlanta, Ga. "Construction of Jackson Orthodontia Appliance."

10. M. F. FINLEY, Washington, D. C. "(a) Repairing Broken Facings. (b) Orthodontia."

11. SOLOMON FREEMAN, New York city. "Practical Hints."

12. W. C. GILLESPIE, Nashville, Tenn. "Cast Bridge, Using Porcelain Teeth."

13. J. A. GORMAN, New Orleans, La. "Orthodontia."

14. WILMER S. HALL, Pensacola, Fla. "Tin and Gold Filling for Molars and Bicuspids, with Original Methods of Separation and Finishing at One Sitting."

15. WILMER S. HALL, Pensacola, Fla. "An Amalgam Filling that Will Not Leak."

16. C. A. HAWLEY, Washington, D. C. "Predetermination of the Dental Arch."

17. C. G. HUGHES, Punxsutawney, Pa. "The Use of Gold Inlays in Connection with Bridge Work."

18. W. O. HULICK, Cincinnati, Ohio. "Bridge on Converged Teeth."

19. A. M. JACKSON, Macon, Ga. "Some Inlay Methods with Gold."

20. V. H. JACKSON, New York city. "Orthodontia."

21. J. B. JORDAN, Nashville, Tenn. "Appliance for Retracting the Superior Anterior Teeth."

22. D. O. M. LECRON, St. Louis, Mo. (To be announced.)

23. T. T. MOORE, Jr., Columbia, S. C. "Cast Inlay."

24. GEORGE A. MARTIN, Philadelphia, Pa. "Method of Preparing Roots and Seating Crowns by Casting Process."

25. A. F. MILLER, Sandusky, Ohio. "Centrifugal Casting."

26. D. J. MACMILLEN, Kansas City, Mo. (To be announced.)

27. S. H. McAFEE, New Orleans, La. (To be announced.)

28. C. L. NANCE, Tampa, Fla. "An Original Method of Casting Without a Machine."

29. T. W. ONDERDONK, New York city. "Hints About the Use of the Matrix; also One with a Celluloid Band."

30. STARR PARSONS, Washington, D. C. "Ancient Dentures from South Carolina."

31. C. C. PRENTISS, Hartford, Conn. (To be announced.)

32. E. G. QUATTLEBAUM, Columbia, S. C. "Parts for Cast Inlays."

33. ROBERT SEYMOUR, Philadelphia, Pa. "Casting Full Plates with Aluminum and Watt's Fusible Metal, with the Seymour Casting Machine."

34. HARVARD T. STEWART, Memphis, Tenn. "Lock Shoulder Crowns as Abutments in Advanced Riggs' Disease Cases."

35. STANLEY C. SMITH, Cincinnati, Ohio. "A Trick to Repair Orthopedic Retainer in the Mouth."

36. R. L. SIMPSON, Richmond, Va. "Cavity Preparation; Positive, Rapid, Automatic."

37. J. J. SARRAZIN, New Orleans, La. "Riggs' Instruments."

38. J. C. WATKINS, Winston-Salem, N. C. "A 'Smith' Crown."

39. GEO. H. WILSON, Cleveland, Ohio. "The Short Compensating Curve."

Chair Clinics.

1. C. L. ALEXANDER, Charlotte, N. C. "Solidified Sponge Gold Inlays."

2. J. Y. CRAWFORD, Nashville, Tenn. "Explaining Any Practical Cases Present."

3. JOSEPH HEAD, Philadelphia, Pa. "The Demonstration of a Tartar Solvent in the Treatment of Pyorrhea."

4. W. G. HAMM, Chillicothe, Ohio. "Paraffin Root-canal Filling in Septic and Aseptic Canals."

5. W. T. JACKSON, Cleveland, Ohio. "High Pressure Anesthesia with Cavity Preparation."

6. J. N. JOHNSON, Goldsboro, N. C. "Alveolar Pyorrhea (after method of B. F. Arrington)."

7. E. M. KETTIG, Louisville, Ky. "Artificial Enamel Fillings Without the Use of the Rubber Dam."

8. ROBERT PURVIS, Camden, N. J. "Extraction of Teeth by Local Anesthesia or Somnoform."

9. W. H. REABEN, McComb, Miss. "Minor Dental Operations under Narcotile Anesthesia and Analgesia."

10. C. H. REYNOLDS, Clintondale, N. Y. "First Treatment of an Alveolar Abscess."

11. W. J. ROE, Philadelphia, Pa. "Cleft-Palate Operation."

12. LEVI C. TAYLOR, Hartford, Conn. "A Hygienic Filling."

13. J. LEWIS WALKER, Norfolk, Va. "Porcelain Enamel Filling."

14. F. WESTERFIELD, St. Charles, Mo. "Extracting with Elevator."

15. ARTHUR ZENTLER, New York city. "Efficient Exclusion of Saliva and Protection of Soft Tissues, in Short Operations, by Use of Clamps and Napkins Lined with Rubber Dam."

16. PAUL G. WHITE, Boston, Mass. "Adenoids and Tonsil Operation by Means of Somnoform and Primary Ether."

FIFTH INTERNATIONAL DENTAL CONGRESS.

Berlin, Germany, August 23-28, 1909.

THE Fifth International Dental Congress will be held in the Reichstagsgebäude (Houses of Parliament).

The Hon. President of the congress is Geheimrat Prof. Dr. WALDEYER, director of the First Anatomical Institute.

Honorary members—Dr. NAUMANN, chief of the Medical Department of the Kultusministerium; Geheimrat Prof. Dr. KIRCHNER.

The business of the congress is conducted by the following committees:

1. Committee on Organization.
2. Berlin Local Committee.
3. Chairmen of the different Sections.

(1) COMMITTEE ON ORGANIZATION.

The Committee on Organization consists of fifteen members.

President—Privy Councillor Prof. Dr. WALKHOFF, München, Briennerstr. 47.

Vice-presidents—Prof. DIECK, M.D., Berlin, Potsdamerstr. 113. Prof. HAHN, Berlin, Lützowstr. 53. HIELSCHER, Köln a. Rh., Hohenzollernring 30.

Secretary-general — SCHAEFFER-STUCKERT, D.D.S., Frankfurt a. M., Kettenhofweg 29.

Secretary—KONRAD COHN, M.D., Berlin, Potsdamerstr. 46.

Treasurer—BLUME, Berlin W., Unter den Linden 41.

(2) BERLIN LOCAL COMMITTEE.

The Berlin Local Committee is composed of thirty-eight members.

Presidents—Professor GUTTMANN, court dentist, Potsdam. ROBERT RICHTER, D.D.S., Berlin, Victoriast. 23. Dr. P. RITTER, Berlin, Königgrätzerstr. 94.

Secretaries—WEIDMANN, Berlin, Bülowstr. 1. GUTTMANN, Berlin, Alexanderstr. 71. PURSCHE, Berlin, Rankestr. 30.

Treasurer—HELM, Charlottenburg, Berlin-erstr. 169a.

(3) CHAIRMEN OF THE SECTIONS.

The following twelve sections have been formed, all of which can hold sessions in the Reichstag building simultaneously:

SECTION I: Anatomy, Physiology, and Histology. *Chairman*, Dr. Adloff, Königsberg i. Pr., Weissgerberstr. 6-7.

SECTION II: Pathology and Bacteriology. *Chairman*, Prof. Dr. Römer, Strassburg i. E.

SECTION III: Chemistry, Physics, and Metallurgy. *Chairman*, C. Birgfeld, Hamburg, Alsterdamm 1.

SECTION IV: Diagnosis and Special Therapeutics; Materia Medica. *Chairman*, Prof. Dr. Michel, Würzburg.

SECTION V: Oral Surgery and Surgical Prosthesis. *Chairman*, Geheimrat Prof. Dr. Partsch, Breslau; Prof. Dr. Schröder, Berlin.

SECTION VI: General and Local Anesthesia. *Chairman*, University Lecturer Dr. Fischer, Greifswald.

SECTION VII: Operative Dentistry. *Chairman*, Prof. Dr. Sachs, Berlin, Kurfürstendamm 247.

SECTION VIII: Prosthetic Dentistry, including Crown and Bridge Work; Ceramics. *Chairman*, Prof. Dr. Riegner, Breslau.

SECTION IX: Orthodontia. *Chairman*, Heydenhauss, M.D., Berlin, Potsdamerstr. 121.

SECTION X: Hygiene of the Mouth and Teeth. *Chairman*, Dr. C. Röse, Dresden.

SECTION XI: Education and Legislation. *Chairman*, Dr. Ritter, Berlin, Königgrätzerstr. 94.

SECTION XII: History and Literature. *Chairman*, Hoffendahl, Berlin, Schöneberger Ufer 20.

During the week of the congress an official daily journal will be published in three languages (German, English, French). Editor: Konrad Cohn, M.D., Berlin, Potsdamerstr. 46.

An international scientific and industrial exhibition will be combined with the congress. Prof. Dr. Dieck, Berlin, Potsdamerstr. 113, Villa 3, has taken charge of the management of this exhibition, which is to be conducted on a large scale. [See notice on following page.]

At the last meeting of the Committee on Organization it was decided that the fee for membership be fixed at 25 marks (\$6.00), which sum will also entitle the holders of membership cards to a copy of the Transactions when published. For participation in the social functions additional cards will be issued by the Berlin Local Committee at a very low price.

A guarantee fund of 20,600 marks has already been subscribed, and it has been decided not to call upon foreign visitors for financial or administrative support.

A hearty invitation is extended to all foreign *confrères*.

PROGRAM.

The following provisional program has been arranged:

SUNDAY, August 22d.

Meeting of the Fédération Dentaire Internationale. Evening: Reception of the guests at the Reichstagsgebäude.

MONDAY, August 23d.

Morning: Opening session. After the official addresses of welcome, four orators (German, English, French, and American) will speak on subjects chosen by themselves and important for the entire profession. The National Committees of the respective countries have each been requested to nominate their orator.

Evening: Reception given by the City of Berlin at City Hall.

TUESDAY, August 24th.

9 A.M.—2 P.M.: Sessions of the Sections.

Evening: Banquet in the halls of the Zoölogical Gardens.

WEDNESDAY, August 25th.

9 A.M.—2 P.M.: Sessions of the Sections.

Evening: Fiftieth anniversary of the Central Verein Deutscher Zahnärzte (Central Association of German Dentists) in the halls of the Rheingold.

THURSDAY, August 26th.

Second general session in the great hall of the Reichstagsgebäude. Subjects and questions will be discussed by speakers appointed by the different countries.

Evening—at the disposal of the congressists.

FRIDAY, August 27th.

9 A.M.—2 P.M.: Sessions of the Sections.

Evening: Reception in honor of the congressists given by the *confrères* of Berlin and of the province of Brandenburg.

Special train to Wannsee.

SATURDAY, August 28th.

9 A.M.—12 M.: Sessions of the Sections (passing of resolutions) and meeting of the Fédération Dentaire Internationale.

3 P.M.: Closing session. Acceptance of the resolutions of the Congress.

Evening: Farewell banquet at the Halensee Terraces.

On Sunday and after, groups of the congressists will visit German cities and universities.

The Bureau of the Congress will be opened four weeks before the opening of the congress. A postal, telegraph, and telephone office will be established, also refreshment rooms.

The size of the Reichstagsgebäude will render it possible for the different sections to meet simultaneously, so that the participants may hear lectures in different sections on one day.

In order to facilitate conversation between men of different nationalities, those *confrères* who speak English will wear a blue badge, those who speak French a red badge.

The Hamburg-American Packet Co. allows to members of the congress a reduction of 25 per cent. except during the height of the season.

The Berlin Local Committee will be pleased to procure lodgings for foreign colleagues and supply them with all information concerning their journey, their sojourn in Berlin, etc.

The prices of rooms in hotels vary from 2.50 to 30 marks per day (\$0.60 to \$7.00). All questions regarding this subject should be addressed to the president of the Local Committee, Professor Guttman, Potsdam.

In order to make the visitors acquainted with the sights of Berlin and its environs, ably conducted excursions have been arranged for. The scientific institutions of importance will also be open to visitors.

INTERNATIONAL EXHIBITION OF DENTAL SCIENCE.

In connection with the Fifth International Dental Congress in Berlin, August 23–28, 1909, an International Exhibition of Dental Science will be arranged, on a large scale, in the Reichstag building.

The progress of dentistry in all civilized countries cannot be better illustrated than by means of a systematically arranged, scientific exhibition.

The nature and extent of the proposed exhibition is evident from the following grouping:

GROUPS OF EXHIBITS.

I. *Anatomy and physiology.*

1. Comparative anatomy. (a) Anthropology and ethnology. (b) Comparative odontology including paleontology. (c) Anomalies of the teeth of animals.

2. Normal macroscopical anatomy of man (anatomy and development of the head, jaws, and teeth, including specimens of the jaws and teeth).

3. Normal microscopical anatomy.

4. Anomalies of anatomical development (anomalies of the development of the head, jaws, and teeth).

5. Physiology.

II. *Pathology and bacteriology.*

1. General pathology.

2. Special macroscopical pathology, including comparative pathology.

3. Special microscopical pathology.

4. Bacteriology of the mouth.

III. *Surgery of the mouth and the jaws.*

1. Surgical therapeutics, including narcosis and local anesthesia.

2. Surgical prosthesis, including obturators.

IV. *Orthodontia.*V. *Preservative treatment of the teeth.*

1. Fillings. 2. Root-treatment.

VI. *Prosthetic dentistry.*

1. Plate work. 2. Crown and bridge work, including ceramics.

VII. *Photography in dental surgery as a means of investigation and instruction.*

1. Macroscopic photography. 2. Microscopic photography. 3. Stereoscopy. 4. X-ray photography. 5. Photography in colors.

VIII. *General dental education, post-graduate instruction; educational appliances.*IX. *Hygiene of the mouth and the teeth.*

(a) From the scientific, and (b) from the social point of view.

X. *History of dentistry.*

Instruments, pictures, and in short, everything of historical interest for dentistry.

XI. *Dental jurisprudence.*XII. *Literature.*

(a) Original works. (b) Periodicals.

The committee desires to be informed of the names of all public or private collections

containing specimens of general or special interest for dentistry.

The committee of the exhibition urgently requests each to use his personal influence to arouse interest in behalf of the International Dental Exhibition.

The committee will take every possible precaution to insure the safety of any specimens loaned.

Prof. Dr. DIECK,

Chairman Committee on Exhibits,
Berlin, Potsdamerstr. 113, Villa 3.

AMERICAN NATIONAL COMMITTEE ON FIFTH INTERNATIONAL DENTAL CONGRESS.

At a meeting of the Executive Council of the National Dental Association held at Pittsburg, Pa., Saturday, October 10, 1908, the following were appointed as the American National Committee, to forward the work of the Fifth International Congress and provide for the representation of American dentistry at that congress—to be held in Berlin, Ger., August 1909:

American National Committee.

Edward C. Kirk, Philadelphia, Pa., *Ch'man.*

Burton Lee Thorpe, St. Louis, Mo., *Sec'y.*

Truman W. Brophy, Chicago, Ill.

A. W. Harlan, New York, N. Y.

B. Holly Smith, Baltimore, Md.

G. E. Savage, Worcester, Mass.

Wm. Carr, New York, N. Y.

W. W. Walker, New York, N. Y.

J. D. Patterson, Kansas City, Mo.

Gordon White, Nashville, Tenn.

Chas. R. Turner, Philadelphia, Pa.

Chas. McManus, Hartford, Conn.

G. V. I. Brown, Milwaukee, Wis.

N. S. Hoff, Ann Arbor, Mich.

F. E. Ball, Fargo, N. Dak.

L. P. Dotterer, Charleston, S. C.

Eugene H. Smith, Boston, Mass.

Chas. L. Alexander, Charlotte, N. C.

COMMITTEE ON ESSAYS.

Edward C. Kirk, *Chairman.*

Burton Lee Thorpe, *Secretary.*

L. P. Dotterer.

COMMITTEE ON CLINICS.

Wm. Carr, *Chairman.*

J. D. Patterson, *Secretary.*

Chas. L. Alexander.

NATIONAL ASSOCIATION OF DENTAL FACULTIES.

THE National Association of Dental Faculties will hold their annual meeting in connection with the National Association of Dental Examiners in the Hotel Chamberlain, Old Point Comfort, Va., August 2, 3, and 4, 1909, commencing at 10 A.M.

Rates will be the same as the National Association of Dental Examiners. Railroad and steamship rates will be given at a later date.

B. HOLLY SMITH, *Chairman Ex. Com.*

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

THE twenty-seventh annual meeting of the National Association of Dental Examiners will be held at the Hotel Chamberlain, Old Point Comfort, Va., the first session opening at 10 o'clock A.M., Monday, August 2, 1909, and continuing during the 3d and 4th.

The result of the mail vote by the committee to ascertain the consensus of opinion as to place and date, from October 19th to the present date was ninety-one votes for Old Point Comfort the first three days of August, thirteen for Birmingham in March, seven for Birmingham in July; the president has therefore selected Old Point Comfort.

The rates will be: American plan \$3.00 per day without bath and \$4.00 per day with bath. Large and commodious meeting-rooms will be furnished free. Railroad and steamship rates will be furnished at a later date.

CHAS. A. MEEKER, *Sec'y.*

LOUISIANA STATE DENTAL SOCIETY.

THE thirty-first annual meeting of the Louisiana State Dental Society will be held at the St. Charles Hotel, in New Orleans, La., on Wednesday, Thursday, and Friday, April 28, 29, and 30, 1909. An interesting program is already assured. A most cordial invitation is extended to all ethical members of the profession to be present and participate in the meeting.

DR. H. J. FELTUS, *President*,
Baton Rouge, La.

DR. J. P. WAHL, *Chairman Ex. Com.*,
3634 Magazine st., New Orleans, La.

DR. A. L. PLOUGH, *Cor. Sec'y*,
New Orleans, La.

THIRD DISTRICT (N. Y.) DEN- TAL SOCIETY.

THE annual meeting of the Third District Dental Society of the State of New York will occur on Tuesday, April 20, 1909, at the Y. M. C. A. Bldg., Albany, N. Y. The meeting will be convened at 10 A.M.

MORTON VANLOAN, *Editor.*

FIFTH DISTRICT (N. Y.) DENTAL SOCIETY.

THE forty-first annual meeting of the Fifth District Dental Society of New York will be held in Syracuse, April 9 and 10, 1909.

R. W. BARRY, *Sec'y.*

CONNECTICUT STATE DENTAL ASSOCIATION.

THE annual meeting of the Connecticut State Dental Association will be held at Waterbury, Conn., April 20 and 21, 1909.

ROBERT H. W. STRANG, *Sec'y.*

MISSISSIPPI DENTAL ASSOCIA- TION.

THE sixteenth annual meeting of the Mississippi Dental Association will be held in Natchez, May 11, 12, and 13, 1909.

L. B. PRICE, *Sec'y*,
Corinth, Miss.

EASTERN KENTUCKY DENTAL ASSOCIATION.

THE recently organized Eastern Kentucky Dental Association will meet Saturday, April 3, 1909, at Ashland, Ky., and every third month thereafter at such place as the vote may direct.

The following officers were elected: R. H. Leete, Prestonburg, President; J. A. Tauber, Catlettsburg, vice-president, and P. H. Williams, Ashland, secretary.

P. H. WILLIAMS, *Sec'y.*

ILLINOIS STATE DENTAL SOCIETY.

THE forty-fifth annual meeting of the Illinois State Dental Society will be held at Danville, May 11, 12, 13, and 14, 1909.

R. J. HOOD, *Sec'y*,
Sparta, Illinois.

NEW HAMPSHIRE AND VERMONT DENTAL SOCIETIES.

A JOINT meeting of the New Hampshire and Vermont Dental Societies will be held at Hotel Weirs, Weirs, N. H., May 18, 19, 20, and 21, 1909, beginning the evening of the 18th.

FRED F. FISHER, *Sec'y*,
Manchester, N. H.

IOWA STATE DENTAL SOCIETY.

THE forty-seventh annual meeting of the Iowa State Dental Society will be held in Des Moines, Iowa, May 4, 5, and 6, 1909. All ethical dentists in the state are urged to be present and help make it the best in the history of the society.

T. F. COOKE, *Sec'y*,
Burlington, Ia.

LEBANON VALLEY (PA.) DENTAL ASSOCIATION.

THE annual meeting of the Lebanon Valley (Pa.) Dental Association will be held in Reading, Tuesday and Wednesday, May 11 and 12, 1909.

JOHN T. BAIR, *Corresponding Sec'y*.

NEW YORK STATE DENTAL SOCIETY.

THE forty-first annual meeting of the New York State Dental Society will be held in Odd Fellows' Hall, Albany, N. Y., May 6, 7, and 8, 1909. [The date given in March journals was erroneous.] Note that the first session will convene promptly at 7.30 P.M. on the evening of Thursday, the 6th.

All day Saturday will be devoted to clinics, when all that is latest and best will be shown. A large exhibit also is assured.

Special railroad rate of one and three-fifths fare has been arranged with the Trunk-line Association. Ask for a certificate, not a receipt, when you purchase your ticket, in order to have the benefit of the reduced rate on the return trip.

PROGRAM.

President's Address. Dr. L. Meisburger.

Correspondent's Address. Dr. H. C. Ferris.

Report of Executive Council. Dr. G. B. Beach.

Report of Committee on Practice. Dr. W. B. Dunning.

Report of Committee on Scientific Research. Dr. L. M. Waugh.

Essays.

"Hard Teeth and Soft Teeth." Dr. Eugene S. Talbot, Chicago, Ill.

"Pyorrhea from a Bacterial Standpoint." Dr. Timothy Leary, Boston, Mass.

"The Relation of the Chemical and Physical Characteristics of Porcelain to Its Manipulation." Dr. W. L. Fickes, Pittsburg, Pa.

"Practical Cavity Preparation." Dr. H. E. Friesell, Pittsburg, Pa.

"The Relative Merits of the Cast and the Malleted Gold Fillings." Dr. D. N. Squire, Buffalo, N. Y.

ELLISON HILLYER, *Sec'y*, Brooklyn.

TENNESSEE STATE DENTAL ASSOCIATION.

THE forty-fourth annual meeting of the Tennessee State Dental Association will be held in Memphis, Tenn., May 25, 26, and 27, 1909. This meeting promises to be one of the most interesting gatherings of any within the history of the association. Ample space will be provided for exhibitors and clinicians. A cordial invitation is extended to all reputable members of the profession to attend and take part in the proceedings.

DELAN KINNEY, *Cor. Sec'y*,
Nashville, Tenn.

ST. LOUIS DENTAL COLLEGE ALUMNI ASSOCIATION.

THE Alumni Association of the St. Louis Dental College (formerly Marion-Sims) will hold their annual clinic at the college building, Grand ave. and Caroline st., on May 20 and 21, 1909.

An excellent program is being prepared. Special attention is being given to the clinical program. The annual banquet will be on Thursday night, and the election of officers for the ensuing year will take place after the clinics the following day.

All ethical members of the profession are cordially invited to be present.

J. B. O'BRIEN, *Ch'm Publicity Committee*,
1404 N. Union Boul'd, St. Louis.

EASTERN INDIANA DENTAL ASSOCIATION.

THE 1909 meeting of the Eastern Indiana Dental Association will be held at Marion, Ind., May 5 and 6, 1909.

The 1908 meeting was postponed that the members might join in the big jubilee meeting of the state society, and the meeting this year is expected to be a record breaker. Clinics are to be the main feature.

LEONARD STRANGE, *President*.

LAKE ERIE (PA.) DENTAL ASSOCIATION.

THE forty-sixth annual meeting of the Lake Erie Dental Association will be held at Hotel Rider, Cambridge Springs, Pa., on May 18, 19, and 20, 1909. All reputable dentists are cordially invited to share in this meeting.

V. H. McALPIN, *Sec'y*.

ALABAMA DENTAL ASSOCIATION.

THE fortieth annual meeting of the Alabama Dental Association will be held in Anniston, Ala., May 11-13, 1909.

The program will be an exposition of present-day methods of practice. Make your arrangements, now, to attend.

E. W. PATTON, *Sec'y*,
1010½ Broad st., Selma, Ala.

KENTUCKY STATE DENTAL ASSOCIATION.

THE thirty-ninth annual convention of the Kentucky State Dental Association will convene at Crab Orchard Springs, Ky., May 17, 18, and 19, 1909. We anticipate a most interesting and profitable meeting at this most popular central Kentucky resort. A cordial invitation is extended to all ethical members of the profession.

W. M. RANDALL, *Sec'y*.

SUSQUEHANNA DENTAL ASSOCIATION OF PENNSYLVANIA.

THE forty-sixth annual meeting of the Susquehanna Dental Association of Pennsylvania, will be held at the Hotel Oneonta, Harvey's Lake, Luzerne co., Pa., Tuesday, Wednesday, and Thursday, May 18, 19, and 20, 1909.

Drs. Edward C. Kirk, H. C. Ferris, and P. B. McCullough will be among the essayists.

Harvey's Lake, the largest body of water in Pennsylvania, is a beautiful summer resort in the mountains, ten miles from Wilkes-Barre, and not only makes an ideal place for the meeting, but affords unusual opportunities for an outing.

Ethical practitioners of dentistry and medicine are cordially invited to attend and participate in the discussions.

EDMOND J. DONNEGAN, *Recording Sec'y*,
Amsden Bldg., Scranton, Pa.

MISSOURI STATE DENTAL ASSOCIATION.

THE forty-fourth annual meeting of the Missouri State Dental Association will convene at Kansas City, Mo., May 26, 27, and 28, 1909. A good, live program is in course of preparation.

Executive Committee: C. C. Allen, chairman, Kansas City; F. G. Worthly, Kansas City; D. D. Campbell, Kansas City.

J. F. WALLACE, *Corresponding Sec'y*.

MASSACHUSETTS DENTAL SOCIETY.

THE forty-fifth annual meeting of the Massachusetts State Dental Society will be held at Boston, Mass., on June 9, 10, and 11, 1909.

W. E. BOARDMAN,
Boston, Mass.

CALIFORNIA STATE DENTAL ASSOCIATION

AND THE

ALUMNI ASSOCIATION OF THE COLLEGE OF DENTISTRY, UNIV. CAL.

THE California State Dental Association and the Alumni Association, College of Dentistry, University of California, will hold a joint meeting on July 6, 7, and 8, 1909, at the College building, Second and Parnassus aves., San Francisco.

Arrangements are being made for a number of prominent eastern dentists to be present and contribute to the clinics and papers, in addition to members from the state.

Manufacturers are being solicited to make exhibits and inasmuch as there will be a series of meetings on the Coast from June

28th to July 23d, it is expected that exhibitors will find it to their advantage to make the circuit.

Fuller details of program will be announced next month.

ROBERT E. KEYS,
Com. on Publicity.

SOUTHERN WISCONSIN DENTAL ASSOCIATION.

THE fifteenth annual meeting of the Southern Wisconsin Dental Association will be held in Beloit, Wis., June 3 and 4, 1909.

C. W. COLLVER, *Sec'y*,
Clinton, Wis.

NORTH CAROLINA DENTAL SOCIETY.

THE thirty-fifth annual meeting of the North Carolina Dental Society will be held at Asheville, N. C., June 23 to 26, 1909. The Battery Park Hotel will be the headquarters.

All ethical practitioners are cordially invited to attend.

J. C. WATKINS, *Sec'y*,
Winston-Salem, N. C.

MICHIGAN STATE DENTAL SOCIETY.

THE fifty-third annual convention of the Michigan State Dental Society will be held at Kalamazoo, on June 29 and 30, and July 1, 1909. An attractive and instructive program is in course of preparation, and a most profitable meeting is assured.

JAMES W. LYONS, *President*.
DON M. GRAHAM, *Sec'y*.

TEXAS STATE DENTAL ASSOCIATION.

THE annual meeting of the Texas State Dental Association will be held at Waco, June 10, 11, and 12, 1909.

We call the attention of manufacturers, exhibitors, and visitors to the circuit formed by the three meetings—Missouri (May 26-28), Oklahoma (June 3-5), and Texas as above. By this arrangement it is expected to secure a larger number of prominent men and valuable exhibits than heretofore.

The profession is cordially invited to attend.

J. G. FIFE, *Sec'y*,
Dallas, Tex.

SOUTHERN CALIFORNIA DENTAL ASSOCIATION.

THE twelfth annual convention of the Southern California Dental Association will convene June 28, 29, and 30, 1909, at the College of Dentistry, University of Southern California, Fifth and Wall sts., Los Angeles, Cal.

CHAS. E. RICE, *Sec'y*.

INDIANA STATE DENTAL ASSOCIATION.

THE fifty-first annual meeting of the Indiana State Dental Association will be held at Indianapolis, June 29 and 30, and July 1, 1909. Plans are being perfected to make this the greatest strictly state meeting ever held in the history of our society.

OTTO U. KING, *Sec'y*,
Huntington, Ind.

MAINE DENTAL SOCIETY.

THE forty-fourth annual meeting of the Maine Dental Society will be held at the Peaks Islands House, Portland, Me., June 24, 25, and 26, 1909. It is confidently expected by the Executive Committee that this will be one of the most successful meetings ever held by this society. All ethical practitioners of dentistry are welcome to these meetings.

E. P. BLANCHARD, *Chm'n Ex. Com.*,
Portland, Me.

H. A. KELLEY, *Sec'y*,
Portland, Me.

NEW JERSEY STATE DENTAL SOCIETY.

THE New Jersey State Dental Society will hold their annual meeting in the Casino, situated on the beach front at Asbury Park, N. J., beginning Wednesday, July 22d, and continuing through the 23d and 24th.

The clinics and exhibits are so large and varied that it has been necessary to secure a large building to accommodate them and the many visitors to the meetings. The Casino is ideally situated, large and cool, and well adapted for dental meetings.

The Hotel Columbia has been selected as headquarters for the society, and it offers superior accommodations and low rates for those desiring to attend the meeting. All the

principal railroads lead to Asbury Park, with many trains daily, also boat connections to New York for those desiring to travel by water.

All the dental profession should mark off the above dates and spend a delightful three days' vacation attending our meeting.

CHARLES A. MEEKER, *Sec'y*,
29 Fulton st., Newark, N. J.

DELTA SIGMA DELTA FRATERNITY

AT SEATTLE EXPOSITION.

THE Seattle Auxiliary wishes to announce the annual Supreme Chapter meeting of Delta Sigma Delta Fraternity in Seattle, on July 21, 22, and 23, 1909. July 24th will be "Delta Sigma Delta day" at the Alaska-Yukon-Pacific Exposition.

C. F. Fiset, *Historian*.

VIRGINIA STATE DENTAL ASSOCIATION.

THE fortieth annual session of the Virginia State Dental Association will be held at The Mecklenburg, Chase City, Va., July 21, 22, and 23, 1909. Every effort is being made to make this the most interesting and successful meeting of our society. Men of national reputation will give clinics and read papers. All ethical practitioners are cordially invited to attend.

W. H. PEARSON, *Cor. Sec'y*,
Hampton, Va.

ARKANSAS BOARD OF EXAMINERS.

THE next meeting of the Arkansas State Board of Dental Examiners will be held in Hot Springs, May 24 and 25, 1909. All applicants are required to pass an examination to obtain a certificate. Examination fee \$15.00.

A. T. McMILLIN, *Sec'y-Treasurer*,
Little Rock, Ark.

MARYLAND BOARD OF EXAMINERS.

THE Maryland Board of Dental Examiners will meet for examination of candidates for certificates May 26 to 28, 1909, at the Dental Department of the University of Maryland, Baltimore, at 9 A.M.

Applicants must pass a written examina-

tion in anatomy and physiology, chemistry and bacteriology, oral surgery, operative and prosthetic dentistry, and pathology, therapeutics, and materia medica; must insert a gold filling in the mouth and submit a plate or bridge of not less than four crowns, the parts being assembled and invested in advance, and soldered in the presence of the board.

Application blanks properly filled out under oath, accompanied by the fee of ten dollars, must be filed with the secretary prior to May 27th.

F. F. DREW, *Sec'y*,
701 N. Howard st., Baltimore, Md.

TENNESSEE BOARD OF EXAMINERS.

THE next regular annual meeting of the Tennessee State Board of Dental Examiners will be held at Nashville, Tenn., May 18 to 21, 1909. Examinations will be held in all branches taught in dental colleges. All applicants for examination must present diplomas from reputable dental colleges, and applications for examination should be made to the secretary ten days prior to the meeting. Examination fee, \$10.00.

F. A. SHOTWELL, *Sec'y-Treasurer*,
Rogersville, Tenn.

NEW HAMPSHIRE BOARD OF REGISTRATION.

THE next meeting of the New Hampshire Board of Registration in Dentistry for examination will be held June 1, 2, and 3, 1909, at Masonic Banquet Hall, Manchester, N. H.

A. J. SAWYER, *Sec'y*,
Manchester, N. H.

TEXAS BOARD OF EXAMINERS.

THE regular meeting of the Texas State Board of Dental Examiners will be held in Waco, Texas, beginning at 9 A.M., Monday, June 14, 1909.

Diplomas not recognized or registered; examinations are required of all. No interchange of license with any other state. No special examination to practitioners already in practice. Applications, accompanied by a fee of \$25, should be in the secretary's hands by June 10th. For further information address.

BUSH JONES, *Sec'y*,
Dallas, Texas.

PENNSYLVANIA BOARD OF EXAMINERS.

THE Pennsylvania Board of Dental Examiners will conduct examinations simultaneously in Philadelphia and Pittsburg, June 9, 10, 11, and 12, 1909. For application papers, or any other information, write to Dr. Nathan C. Schaeffer, secretary Dental Council, Harrisburg, Pa.

W. D. DeLONG, *Sec'y.*

KENTUCKY BOARD OF EXAMINERS.

THE Kentucky State Board of Dental Examiners meets the first Tuesday in June at 8 A.M. in the Louisville College of Dentistry for the examination of applicants for certificate.

All applicants must be graduates of a reputable dental college. On request, the secretary will furnish application blanks for examination, which, with the fee of \$20, must be in his hands ten days before the date of examination.

J. RICHARD WALLACE, *Sec'y,*
The Masonic, Louisville, Ky.

ILLINOIS BOARD OF EXAMINERS.

THE next regular meeting of the Illinois State Board of Dental Examiners for the examination of applicants for a license to practice dentistry in the state of Illinois will be held in Chicago at the Chicago College of Dental Surgery, S. E. corner Wood and Harrison sts., beginning Thursday, June 10, 1909, at 9 A.M.

Applicants must be in possession of the following requirements in order to be eligible to take the examination: (1) Any person who has been engaged in the actual, legal, and lawful practice of dentistry or dental surgery in some other state or country for five consecutive years just prior to application; or (2) is a graduate and has a diploma from an accredited high school, or a certificate signed by a state superintendent of public instruction or his duly authorized deputy or equivalent officer, acting within his proper or legal jurisdiction, showing that the applicant has a preliminary education equal to that obtained in an accredited high school, and is

a graduate and has a diploma from the faculty of a reputable dental or medical college, school, or dental or medical department of a reputable university, and possesses the necessary qualifications prescribed by the board.

Candidates will be furnished with proper blanks and such other information as is necessary on application to the secretary. All applications must be filed with the secretary five days prior to the date of examination. The examination fee is twenty dollars, with the additional fee of five dollars for a license.

Address all communications to

J. G. REID, *Sec'y,*
1204 Trude Bldg., Chicago, Ill.

CONNECTICUT DENTAL COMMISSIONERS.

A MEETING of the Dental Commissioners of the State of Connecticut will be held on Thursday, Friday, and Saturday, June 24, 25, and 26, 1909, at Hartford, Conn., to examine applicants for license to practice dentistry.

GILBERT M. GRISWOLD, *Recorder.*

MICHIGAN BOARD OF EXAMINERS.

THE next meeting of the Michigan State Board of Examiners for the examination of candidates for license to practice dentistry in Michigan will be held at the Dental Department of the University of Michigan in Ann Arbor, beginning Monday morning, June 14, at nine o'clock. Applications must be in the hands of the secretary at least fourteen days before the examination. Application blanks and rules governing examinations will be furnished by any member of the board.

A. B. ROBINSON, *Sec'y-Treasurer.*

NEW JERSEY BOARD OF REGISTRATION.

THE New Jersey State Board of Registration and Examination in Dentistry will hold their semi-annual examination in the Assembly chamber of the State-house, Trenton, N. J., beginning Tuesday, July 6, 1909, and continuing through the 7th and 8th.

Practical examinations will be held on the 6th, theoretical examinations on the 7th and 8th. Practical work consists of soldering a gold or silver plate, one gold filling, and one amalgam filling. The gold filling must be an approximal one, with an approximating tooth in position.

Candidates are requested to bring their patients. Photograph and preliminary credentials must accompany the application. Sessions begin promptly at 8 A.M., each day.

Applications must be in hands of the secretary ten days prior to the examination.

CHARLES A. MEEKER, D.D.S., *Sec'y*,
29 Fulton st., Newark, N. J.

ARMY DENTAL CORPS.

Changes in duty and station of dental surgeons of the army for the month ending March 13, 1909.

S. D. Boak, ordered to Vancouver Barracks, Washington, for duty, upon return from Cuba.

E. J. Craig, ordered to Fort Omaha, Nebr., for twenty days, and thence to Fort Crook, Nebr., for one month.

E. P. R. Ryan, ordered to Fort Robinson, Nebr., for one month, and thence to Fort Meade, S. D., for one month.

G. I. Gunckel, ordered to Fort Caswell, N. C., for temporary duty.

Guerini's History of Dentistry.—We are pleased to announce that the publishers of this work expect to have the volume ready for delivery by May 1, 1909.—N. D. A. COMMITTEE ON HISTORY.

UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING FEBRUARY 1909.

February 2.

- No. 911,068, to A. C. PERKINS. Tooth-pick.
- No. 911,078, to F. SHEINMAN. Artificial tooth.
- No. 911,307, to J. W. IVORY. Matrix retainer.
- No. 911,398, to J. W. IVORY. Artificial tooth.
- No. 911,510, to R. M. MAYES. Dental hand-piece.
- No. 911,523, to CHAS. PIERS. Antiseptic syringe.

February 9.

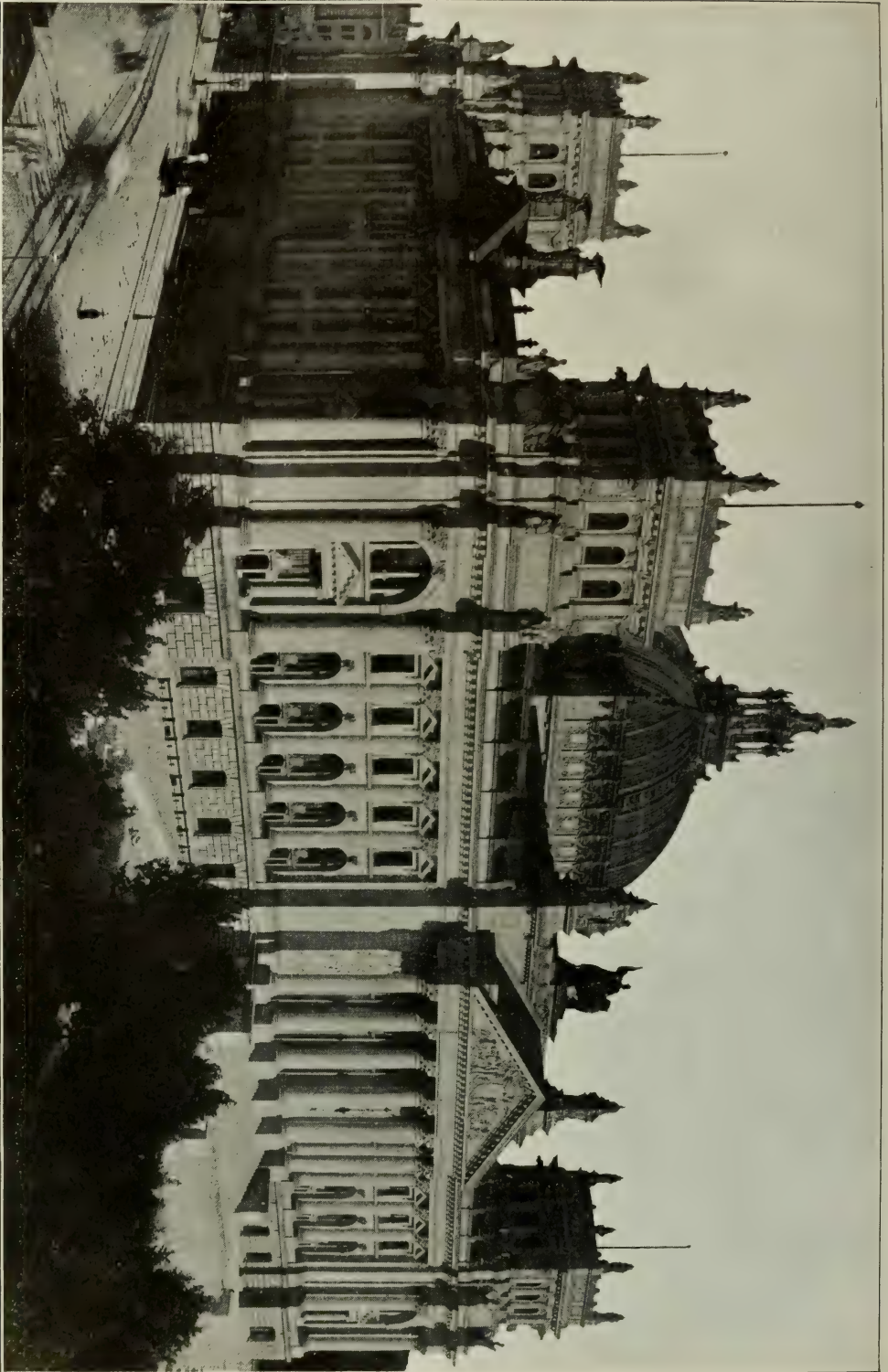
- No. 911,646, to W. A. COOK and G. S. HADLEY. Atomizing dental obtunder.
- No. 911,659, to A. J. KLEBERG. Dental mirror.
- No. 911,664, to JAS. P. LOCKE. Dental floss holder.
- No. 911,680, to L. F. REGAN. Shears.
- No. 911,687, to H. E. VOGEL. Hot-air syringe.
- No. 911,724, to F. S. HONSINGER. Syringe.
- No. 911,889, to F. M. LEVETT. Polishing wheel.
- No. 911,933, to J. C. BAHR. Head-rest.
- No. 912,026, to C. R. POWERS. Dental suction plate.
- No. 912,051, to J. H. ABBOTT. Dental brush.

February 16.

- No. 912,306, to C. E. GRAHAM. Brush.
- No. 912,308, to F. G. GRIMLER. Sectional stand.
- No. 912,500, to H. H. SNYDER. Blowpipe.
- No. 912,532, to HEINRICH BRAT. Combined respirator and inhaler.
- No. 912,742, to P. W. SHUTE. Inhaler.
- No. 912,748, to GEO. B. SNOW. Articulator.
- No. 912,784, to C. H. BAYLEY. Mallet.
- No. 912,810, to S. S. CARLETON. Matrix clamp.

February 23.

- No. 913,049, to Oscar H. PIEPER. Extensible bracket.
- No. 913,072, to G. W. THORSELL. Shears.
- No. 913,184, to C. L. ALEXANDER. Tooth-brush.
- No. 913,210, to M. F. HENLE. Artificial tooth.
- No. 913,297, to KARL KRAUTSCHNEIDER. Medical apparatus for injecting purposes.
- No. 913,339, to GEORGE E. WOOD. Tool handle.
- No. 913,340, to GEORGE E. WOOD. Percussively operated hand tool.
- No. 913,575, to C. W. SPRAGUE. Tension device for shears.



REICHSTAGSGEBÄUDE, BERLIN, WHERE THE FIFTH INTERNATIONAL DENTAL CONGRESS WILL BE HELD.

THE DENTAL COSMOS.

VOL. LI.

MAY 1909.

No. 5.

ORIGINAL COMMUNICATIONS.

THE FARADIC CURRENT IN DENTAL DIAGNOSIS.

By COLEMAN TOUSEY, A.B., D.M.D., Boston, Mass.

ONE of the commonest and most baffling problems presenting itself to the dentist is the detection, under unfavorable conditions, of dead or dying pulps. A patient presents himself, let us say, with a history of severe neuralgic disturbance, often of ill-defined origin and location and perhaps of intermittent character, persistent floating pains that seem to locate anywhere from the lip to the middle ear. A close examination may reveal no external defect in the tooth-structure, at any rate no cavity left unfilled. The history of the case is such, nevertheless, as to create the belief that the disturbance is of dental origin; that in one or more teeth degeneration of the pulp has occurred, perhaps with septic inflammation of still deeper character; or, perhaps, on the contrary, that pericemental abscesses, of whatever origin, without death of the pulp, are simulating these commoner lesions. In any case, it becomes necessary to inform oneself as to the vitality of every tooth on which a possibility of doubt rests, and in the obscurer cases, of all teeth in both jaws lying back of the median line on

the affected side. The following tests are commonly recommended:

First: *Percussion for soreness.* This perhaps has been the surest aid in diagnosis. If there is much pressure or if the inflammation has extended beyond the foraminal opening of the tooth, there is frequently a painful response to the blow. This being found, with some notable exceptions it is only a matter of precaution to look farther. These exceptions consist of pericemental abscesses, or lower inflammations of calcic or traumatic origin which simulate with surprising faithfulness the soreness due to pulp-infection. Cases are not infrequent, too, where debility, disease, or neuralgic disturbances have set up a condition of general hypersensitiveness or even acute inflammation in the gums and teeth—a condition which may entirely obscure a local pulp-infection or resemble it so closely as to force a wrong diagnosis. Such a failure leads to needless injury both to the teeth and to the vitality of the patient, while stirring to renewed activity the symptoms it was hoped to allay. Accepting the theory

that the alveolar process with its soft tissues is in effect an end-organ, the list of inflammations to which it is subject becomes indeed a formidable one. Such a list needs no discussion here. The point in immediate question is the differentiation between the health of the pulp and its degeneration and death.

Again, it is a common thing for an ulcerated tooth to show no sign of disturbance till the presence of pus pointing beneath the mucous membrane demonstrates its condition, so slowly has the inflammatory process proceeded. Seemingly at times, too, the pericemental fibers suspend the tooth with such firmness that the response to percussion is faint and obscure, even in cases of acute inflammation. Calcification of the pericementum and solidification of the tooth in its bony socket absolutely absorb the shock and render the tooth inert, according to the degree to which ossification has taken place. Thus, while at times a luminous test, percussion frequently is negative, and again entirely misleading, pointing to conclusions absolutely at variance with the truth, as will be shown later in cases selected from practice. Regarding percussion for sound, as suggested by Dr. C. F. W. Bödecker of Berlin, it may be fairly assumed that its successful practice requires an ear so hypersensitive as to be beyond the powers of the average dentist. Under the most favorable conditions, the results can be little more than suggestive.

Second: *Heat and cold.* No dentist of any experience dares to rely to any great extent on these agents. The varying thickness of dentin and enamel, as well as the radiating surface of the tooth, the fillings of unknown depth and material, thick leathery decay, and the possibility of deposits of secondary dentin so heavy that the pulp may be entirely below the gingival line, and, lastly, the difficulty of application and localization in the mouth, render uncertain in the extreme the use of so clumsy an agent. Valuable at times in showing the trend of the inflammation—patients can in certain well-marked cases report accurately the shock from cold

liquids and the increased pressure from heat—it is nevertheless negative and valueless in the obscurer cases.

Third: *Transillumination.* This third test we find to be the least reliable one of all. Discoloration often takes place very slowly, sometimes scarcely at all after death of the pulp, while immediate degeneration is seldom disclosed. Furthermore, discoloration due to extensive or leaky fillings, imperfectly excavated cavities, or the filling materials themselves, renders a differential diagnosis, except in rare cases, misleading or impossible. Too often we are reduced to exploratory cutting in each of many suspected teeth, to the great anxiety of the operator and the intense discomfort of the patient.

THE FARADIC CURRENT.

In these cases the use of the faradic current in the manner to be explained is suggested. This is adaptable to almost every case, readily and simply handled, inexpensive both as to apparatus and maintenance, painless and practically certain in its results.

Nor is its use confined to these more insistent troubles. The lesser and more numerous problems of everyday practice, the varying methods of procedure that hinge upon the vitality or non-vitality of the teeth, are solved with the greatest readiness and dispatch. For instance, the careful exploratory work attending the cleansing of large and suspicious cavities may be eliminated. A decision may immediately be rendered in advising the porcelain jacket over the pivot crown for centrals, the gold crown over any other restoration for the molars, in fact in every case where the protection of the pulp or the possible use of its empty chamber lays down the general character of the work. While designed at first for the diagnosis of baffling cases, it has proved its value in the more numerous questions of less moment, and has reduced appreciably the routine work of daily practice.

There is little literature and less history regarding its use. In June 1902 I

demonstrated the method before the Harvard Dental Alumni. In January of the following year Dr. W. J. C. Fuyt of Amsterdam published independently, in the *Nederlandsch Tijdschrift voor Geneeskunde*, an article concerning the same method. In the same year the *COSMOS* published, in its report of a meeting of the First District Dental Society of New York, a discussion along similar lines by Dr. John E. Grevers, also of Amsterdam, with whom Dr. Fuyt had been associated. Since then, to my knowledge, nothing further has appeared.

For those unfamiliar with this form of induction coil, a short description of its mechanical construction precedes the technique of application. A number of typical cases selected from the records of actual practice will conclude the discussion.

MECHANICAL CONSTRUCTION.

There are three forms of electrical energy that are commonly used in medical work—the galvanic, the static, and the faradic. Of these the galvanic, with its low voltage and heavy amperage, has long been recognized in dentistry, but its field, restricted to cataphoresis, has gradually given way to the later methods of pressure anesthesia. For diagnostic work the apparatus is too slow, too low in voltage and high in amperage, too cumbersome and expensive, while not delivering the quick and sharp blow that is most essential in seeking the degenerate reaction of this tissue. The static current, with its enormous voltage and infinitesimal amperage, cannot be controlled and directed for dental service and must also be set aside. Between the galvanic and the static, however, stands the faradic, delivering under high and flexible voltage a sharp, easily controlled current of minute quantity. With no measurable heat and no chemical action, it delivers under high tension its rain of tiny blows, readily penetrating even so perfect a non-conductor as tooth-structure, and eliciting prompt and characteristic response from healthy pulp tissue.

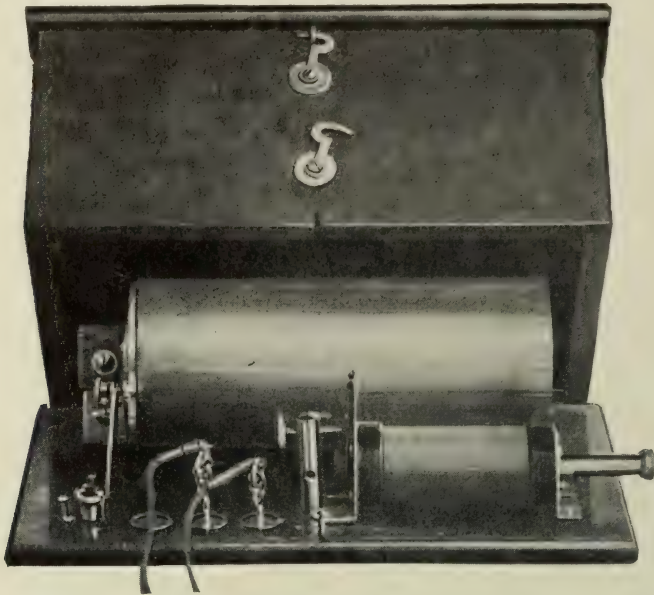
There are on the market two forms of instruments varying in their current control. One, usually the smaller and cheaper type, is regulated by a removable core shield, the "tube of Duchenne." (Fig. 1.) The other, the so-called sledge instrument, is regulated by moving the secondary coil over the primary, and is better adapted for professional use. (Fig. 2.) In principle, however, they are the same. That principle is that any change, whether of force or position, in a galvanic or magnetic field gives rise to a current of electricity, the secondary current, in a circuit placed near to but not in contact with that field. This secondary current is not parallel to the original current, but opposed to it when made and parallel to it when broken. Between the make and break in the primary circuit, since there is a steady current and no change, no current is induced in the secondary. Evidently, therefore, the current in the secondary coil is an alternating one, depending on the rise and fall in the primary circuit.

In medical instruments this galvanic field, the primary circuit, is represented by a number of turns of relatively heavy copper wire, usually about 300, wound about a hollow non-conducting cylinder. Within this cylinder but entirely out of contact with the wires lies a bundle of soft iron rods, the core; this, as already mentioned, is covered in one type of instruments by a movable brass tube, the tube of Duchenne. Again, outside both wire and core, but not in contact, lies another and much longer coil of relatively fine wire—usually about 5000 turns—the secondary circuit. The initial galvanic current may be instituted in various ways, but for our purpose the dry cell is sufficiently accurate and the most convenient. Recalling now that any change of force in a galvanic field gives rise to an opposed current in an adjoining field, it is apparent that when the motive cell is cut into the primary circuit, the current passes through its windings. At the instant of the making of the current there is instituted in the secondary coil another current, but this in the reverse direction. Immediately,

however, the initial cell current in the primary steadies itself and flows smoothly, and there being no change in the inducing force the secondary current passes away. But, again, the instant the primary current is broken, the ensuing change of electrical force induces the inevitable current in the secondary coil, but now in the opposite

iron rods. It will be readily apparent that the current of the cell as it passes around this mass of soft iron converts it into a magnet. By an ingenious arrangement, a steel spring, the so-called vibrator through which passes the cell current, is placed in close proximity to this occasional magnet. No sooner does the current pass the primary coil than

FIG. 1.



Typical small instrument showing removable core shield—the "tube of Duchenne."

direction, and consequently parallel to the flow of the primary circuit. Thus it is evident that the current in the primary, whether at make or break, is always positive; but in the secondary it is alternating, the poles changing with the fluctuations of the original circuit. This is the coil in its simplest form.

The physiological effect of the second current is dependent, among other things, however, on the brusqueness of the make and break in the primary. Some mechanical means are therefore required to give the necessary changes at high speed. This brings us back to the core lying within but insulated from the primary circuit and defined as a bundle of soft

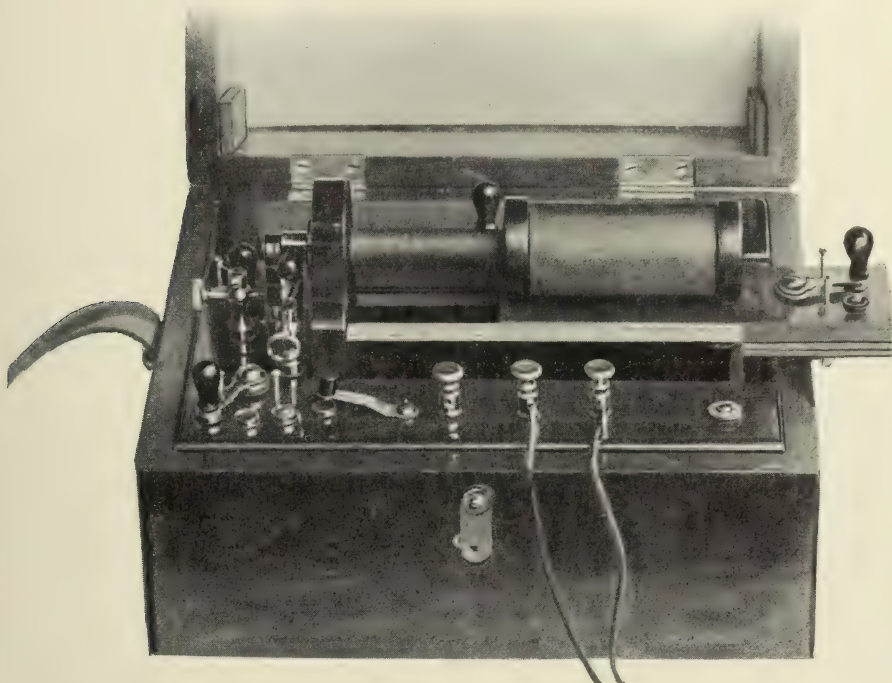
the iron polarizes, becomes a magnet, and, snatching the spring to itself, breaks the circuit. Instantly then, the magnet being dissolved, the tension of the spring reasserts itself. It flies back and completes the circuit, only to be drawn once more from its bed.

The purpose of the iron core is not, however, limited to this mechanical activity, but it exerts a profound influence over both primary and secondary currents, for it must be remembered that a change of magnetic as well as galvanic field induces a current in the adjoining circuits. The fact, too, that the coils of wire in the same circuit react on themselves, and that the secondary current

necessarily reacts to some degree on the primary one, introduces still other modifying features. These, the so-called extra currents, alter the character and physiological effect of make and break in both circuits, to the end that for practical purposes in both primary and secondary circuits the make disappears, and

tube, the tube of Duchenne. (Fig. 1.) This when in place so interferes with the interacting lines of force as to largely negate both primary and secondary currents, and they are consequently strengthened by its gradual removal. The objection to this method is that it does not entirely kill the current, and in the at-

FIG. 2.



Typical physicians' battery, showing the second coil on sledge.

we reckon only with the current of break or demagnetization. So great is the rapidity with which the current is made and broken that the lighter shock of the make is entirely absorbed by the heavier break, and the sensory organs respond to that alone. It is only when one wishes to use the single contact key with which the better machines are equipped that differentiation becomes necessary.

Current control is gained for the most part and for our service entirely by two methods according to battery construction. In one style, the cheapest, the soft iron core is covered with a movable brass

tempt to use a very light stroke when the presence of a large metallic filling has greatly reduced the resistance, an unpleasant shock may be the occasional result. With such an instrument it is necessary to carry on the lower readings with the primary circuit—for the secondary cannot be reduced sufficiently to use on a live tooth—switching on to the secondary only when the primary has elicited no response.

In using this style of instrument, the dentist must determine by experiment on his own person—his tongue, teeth, and hands—the ascending scale of physio-

logical reaction. And, having found the point at which the primary gives a response equivalent to that of the secondary in its lowest register, note should be made of it to complete the scale, which is now roughly complete from its lowest to its highest register. Unscientific as this method is, a more accurate determination of the scale is perhaps unnecessary for ordinary service, for reasons that will be made apparent later. Used in this way, the cheap little single-cell batteries will give good results if the small saving in expense is to be considered, the suggestion being made that a scale of ten divisions be scratched on the movable tube for guidance—for nothing of the sort is provided on any such instrument with which I am familiar.

The other type of instrument is the so-called sledge, in which the secondary coil is moved bodily over the primary, its position being registered on a scale. (Fig. 2.) It will be readily apparent that the possible entire removal of the secondary coil reduces the current to practically nothing, while it is increased to any desired extent by sliding the coil over the primary. Thus the current can be reduced as low and carried as high as desired without change from one circuit to another. My own instrument is the Waite & Bartlett, No. 35½, the scale of which is divided into 100 parts. It is provided with a fast and slow vibrator and single-stroke key. Practical experience has shown, however, that the fast gives better results than the slow, for the penetration of the current depends much on the sharpness of the current change, the single-stroke proving ineffective and uncertain.

Regarding now the form of electrode for use in the mouth and hand, careful insulation of the dental electrode is most essential, for a very painful shock might follow an accidental short circuit with the mucous surfaces when trying an unresponsive tooth with the higher currents. The smaller and tapering end of an ordinary hard-rubber penholder has been adapted to this purpose and found very satisfactory. This is cast hollow, and it is an easy matter to set into it with

oxyphosphate cement a German silver tube, which will be wholly protected from possible contact. Into this may be fitted at one end the conducting cord from the battery simply by attaching to the cord an old broach bent a trifle so that it may be inserted after the fashion of the wire of a Morgan-Maxfield diskholder, and retained by friction. (Fig. 3.) At the smaller end, three platinum wire points should be fitted, bent as shown, in order to reach any desired position without touching other parts. These points should be roughened or threaded in order to carry a wisp of moistened cotton, for the point of contact of the wire itself would otherwise be so small and imperfect as to render difficult and uncertain the passage of the current. It is then only necessary to pass the wire through the flame to remove the cotton and cleanse for further use. Some form of manual electrode is furnished with every instrument, any one of which will do, it being only suggested that it be moistened in order to insure contact. Patients are at times a bit nervous at the idea of anything electrical being used about the teeth, and may be discovered gingerly holding the electrode between two dry fingers. This would, of course, largely increase the body resistance. It is well to make this factor as constant as possible.

Any absolute measurement of the faradic current is for various reasons impossible, and it is usual to speak of it in terms of its physiological reaction, viz, strong, medium, and weak. The approximate readings on the scale of 100 may easily be referred to these qualities.

While the body resistance is high (Dr. Price estimates that from the tooth to the hand to be about 8000 ohms), it is readily traversed by the high pressure of the induction coil. The vibrator being once adjusted should be left undisturbed, for changes in the rapidity of vibration affect also the physiological reaction.

TECHNIQUE OF APPLICATION.

Now as to the technique of application. The histological structure of the

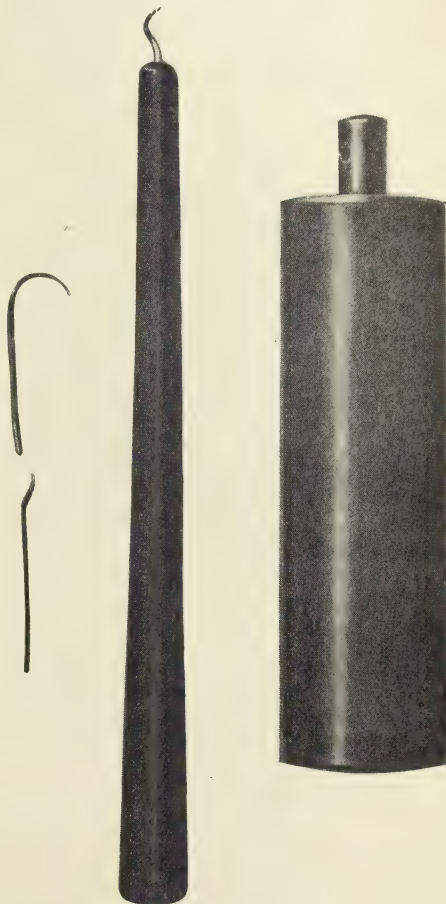
dentin and pulp and their relative position adapt themselves happily to the faradic test. In the first place, the pulp lies closer to the major part of the exposed crown than does the gum or any other soft tissue. Hence the current tends to seek this shortest path in completing its circuit. As for the intervening structures, the tremendous resistance of the enamel, should the test be made through that body, renders the passage of the current impossible save at the thinnest point, which lies directly beneath the electrode. The dentinal tubules, with their moist contents, then pick up the current, again directing it through the shortest possible path into the pulp itself, their calcified matrices rendering diffusion of the current impossible. Below these structures lies the pulp, practically insulated from the adjoining soft tissue save through its longitudinal axis and foramen, thus restricting to its body the current of the test.

Needless to say, an infinite variety of conditions is to be met with. Teeth sound, teeth decayed, teeth extruded and loose, teeth filled with any and every sort of material to any degree, or capped with porcelain or covered with gold. Of these, however, the crowned teeth alone are unadapted to the faradic test, for the reason that while porcelain renders the passage of the current impossible, the gold shell is insulated from the tooth by its cement lining, and the metal conducts the current directly into the gum.

In making the test on any tooth, pick out, if present, any small metallic filling not in contact with the gum. Such a filling, by cutting down the resistance, expedites the test. Dry the tooth to prevent short-circuiting into the gum, if the high power should be used, and touch the filling with the moist dental electrode. The patient should grasp the moistened manual electrode firmly. Start with the lowest current, and, if there is no response, increase progressively five or ten points on the scale on each test. Reference, incidentally, in all these readings is made to the Waite & Bartlett instrument, No. 35½, and its scale of 100. Or-

dinarily, if degeneration of the pulp has not taken place, there will be prompt response, often as low as 0, and seldom running over 30. If, however, there is no reaction at 30, the condition of the pulp is suspicious, although an excep-

FIG. 3.



Dental electrode with platinum points and manual electrode.

tionally heavy body of dentin, especially secondary dentin, may prevent the passage of the current. Continue the increase carefully. At 50, it is practically certain that degeneration is complete, but, to make sure, the current can be carried to the strength of the battery without sensation.

In case there are no fillings or cavities present, the resistance and readings are higher, varying roughly from 10 to 80. Pick out any convenient spot for the test, and here, as always, dry the tooth to prevent short circuits. It is usually better to select some worn surface or occlusal fissure in order to avoid as far as possible the very high resistance of thick enamel. The incisors and canines are readily tested on their labial faces about midway between the cutting edge and the gum, but if there is pronounced wear on the tips they are better tested there. Naturally there is considerable variation in the point of low sensation, depending on the thickness and resistance of the enamel and dentin, the age and temperament of the patient, etc. Caution should be used, not jumping ahead too fast. If 50 is reached without sensation the conditions are suspicious, while at 80 it is practically certain that death has taken place. The full current should be used, however, in final assurance.

Should the tooth in question be heavily filled, with the possibility of hidden contact with the gum, proceed as above, except more cautiously in high registers, lest by moisture or otherwise the thin insulating substance of the tooth might be bridged and an unpleasant shock result. In those cases where it is necessary to test the tooth on a large filling which reaches the gum, the effect is equally decisive. It is here necessary, however, to differentiate between nerve and gum reaction. This is usually an easy matter, for the live pulp gives that curious characteristic and vivid shock as of drilling into a sensitive cavity, as of "nerve" itself, which seldom calls for confusion in the mind of either dentist or patient. The sensation on the gum is totally different—not at all acute, but an odd prickling, crawling, astringent sensation entirely without the reflex jump of the responding nerve—a sensation not unpleasant in itself, which can usually be carried up till distinct twinges are felt in wrist and hand as well. Whenever, it might be added, sensation is experienced in the hand with-

out the unmistakable "nerve" reaction in the tooth, it may be inferred with certainty that the pulp is dead. Indeed, the same statement can probably be made when the current is felt plainly on the gum but not in the tooth, for in those cases where the filling is in contact with the gum there is seldom response from that insensitive tissue below 25, while the response, should the pulp be alive, is seldom over 15, and usually far less.

While the average patient will tell you instantly whether the sensations in the mouth are "nerve" or "gum," in a few cases it has been found wise to demonstrate the difference by touching any favorable neighboring tooth known to be normal and the bare gum. It is suggested that the operator familiarize himself with these reactions by testing in all possible ways his own teeth, tongue, and gums, in order to clarify his conception of the faradic reaction under varying conditions.

Approximal fillings need to be safeguarded lest the current be communicated from one tooth to another. This can be readily accomplished by slipping a tiny sheet of mica of the size of a matrix between the two teeth. The well-known difficulty of correctly locating dental pain renders it necessary to confine any test to one tooth at a time.

It need hardly be suggested that the test should never be made on a filling of the insulating class—gutta-percha, cement or porcelain—nor on enamel or dentin directly overlying such materials; nor is this ever necessary, for other and more favorable places can be found in every case.

The question as to the diagnosis between the early degenerative inflammation and absolute death of the pulp is one involving difficulties which are not present in the diagnosis between health and death. The extreme variation in the resistance to be met with renders any absolute scale impossible. A small occlusal filling in a molar tooth, for instance, may give a sharp response at 5, while another presenting apparently the same condition may not respond until 20 is reached. But there may be present

in the latter case a far thicker layer of dentin, or secondary deposits, or calcification and obliteration of the dentinal tubules; and it has been shown by Dr. Price in his cataphoric tests that secondary dentin presents a far higher coefficient of resistance than normal dentin. And not only is it impossible to standardize the resistance of the tooth, but of the body as well. Even the battery itself varies to a certain degree, depending on the condition of the cell, the speed of the vibrator, etc.; all of which tends to render valueless comparative readings of small differential.

The possibility of such a diagnosis, however, occupied attention for some time until it became evident that the question was for the most part one of academic interest. Coupled with the fact that in the nature of things comparative readings must be somewhat uncertain, few cases present themselves where such a decision need be rendered. It is possible that the inflammatory disturbances of early infection, of pulp-stones and traumatism, as well as the neuralgic pains of alveolar disease and altered nutritional states, might reveal themselves in a condition of hypersensitiveness to the current. My limited data in such cases, however, do not permit conclusions.

After all, the main question, which we meet in at least 99 per cent. of the cases in practice, is the differentiation between life and hopeless degeneration and death. It is this decision that the faradic current enables us to make with certainty, and on this decision we rest our plans for the carrying out of operative measures toward the relief from pain.

In order to serve both as a guide and a warning against careless use, the following rough presentation of the average physiological reaction of hand and tongue, as indicated on the scale of the instrument, is appended:

No sensation if pulp is dead:

100
90

Average range through unbroken structure:

80
70
60
50
40 Maximum for hands.
30 Moderate for hands, maximum for tongue.

Average range through metallic fillings and cavities:

20 Minimum for hands, moderate for tongue.
10
0
-10 Minimum for tongue.
-20

TYPICAL CLINICAL CASES.

Case I. Mr. R., age thirty. Continued pain along right side of the face and jaws. Had been under a physician's care and treated for neuralgia for some time without improvement. All teeth in place and more or less filled, but no sign of dental disturbance, no soreness, no sensitiveness, no discoloration, and no cavities. There were, however, two treated molars in the upper jaw, and these had been reopened without relief. Tests were made with the faradic current, which showed normal response from all teeth, save the upper right lateral, where there was no reaction. There was no apparent soreness, however, to percussion, nor discoloration, and no history of injury, the only defect being a small approximal gold filling. On opening, a copious discharge of pus followed the drill, and an eventual cure was effected after a somewhat prolonged treatment.

Case II. Prof. T., age sixty. Continued pain in upper right first bicuspid, with every symptom of alveolar abscess—pain, soreness, elongation, and swelling of the face, with a fistula just opened and discharging high up on the labial wall opposite the root. The tooth itself showed no defect, and the gum was normally adhering, though perhaps a trifle inflamed. Faradic current applied in occlusal fissure showed normal vitality at about 30, and the trouble yielded to treatment for pyorrhea, viz, removal of serumal deposits close to the apex via the sinus, splinting, etc. This case illustrates the readiness with which an error in diagnosis might have been made, the accepted symptoms of alveolar abscess be-

ing unmistakably present, yet proving different etiologically.

Case III. Mr. B., age fifty. Continued pain and swelling below bicuspid on left inferior maxilla. First molar had been treated and reopened by another dentist, with no alleviation of symptoms. All teeth sore but entirely sound, save the molar referred to. Faradic current gave normal responses on bicuspid, but none on canine. This, when opened up, proved dead and putrescent. Extraction, following an unsuccessful treatment, showed a double-rooted tooth, with both roots badly abscessed.

Case IV. Mrs. K., age fifty. Removed a poorly fitting gold crown on upper first bicuspid, the irritation of the band at the cervix having caused serious alveolar disintegration. The tooth was very loose, sore, and somewhat discolored, half the crown being gone. The question was whether the soreness was due in part to pulp-putrefaction, and also whether to advise a pin or porcelain jacket crown. The faradic current gave prompt response at 10. After the usual treatment for pyorrhea and the insertion of a platinum porcelain-faced jacket crown, the parts recovered their normal tone.

Case V. Mr. R., age fifty-five. Upper right central sore, painful and loose, with a fistula half up the root discharging profusely. No cavity in tooth, and mouth otherwise in perfectly healthy condition. Two different dentists had diagnosed dead pulp and consequent abscess, one advising opening up and treatment; the other extraction. Tested with the faradic current, it responded readily at 20, and the case yielded to a somewhat prolonged treatment for pyorrhea.

Case VI. Miss L., age twenty. Porcelain crown desired for upper right first bicuspid on account of an enormous and disfiguring cement filling. Found on removing the filling that the tooth had not been treated, but it did not, however, seem at all sensitive to the bur. It responded normally to the faradic current, however, and a large porcelain restoration was made leaving pulp intact.

Case VII. Mr. W., age fifty. Three upper incisors heavily filled with inlays. Desired to know if any had been treated in order to set a Roach attachment for partial plate in a pulp-chamber. Tested through unbroken enamel on their labial faces, the centrals responded normally at 35, and the lateral at

50. In the case of the lateral, which had been more extensively filled, it is probable that a deposit of secondary dentin accounted for its higher reading.

Case VIII. Mr. H., age fifty. Very large cavity under loose filling in canine. After excavating with practically no sensation, one could plainly see part of the original pulp-tract apparently filled with secondary dentin. It was feared that pulp-death had occurred. It responded, however, promptly at 10, and was filled with a non-conducting material, without subsequent trouble.

Case IX. Mr. G., age thirty-two. Very hard teeth, but an upper molar with an enormous occlusal cavity. On excavating, one could see the concentric circles of the original pulp-cavity. No sensation from instruments. Doubtful reaction to cold. The faradic current gave sharp response at 0, however, and the tooth was successfully filled, with the usual precautions, over the deeper portions. This cavity took in the whole interior of the tooth practically to the gum line, and was so enormous that it was difficult to believe that the root-canals were not exposed and putrescent. There had been a deposit of secondary dentin, very unusual in one so young.

Case X. Dr. T. Occasional burning flashes in pulp of upper right central. No cavity, but a very large inlay of some years' standing. No soreness. Faradism gave no response, and upon opening, the pulp was found stagnated, with slight sensation at apex only as pulp was removed with a broach.

Case XI. Mrs. B., age thirty. Removed gold crown on lateral for irritation and pus about cervix. The root appeared cut and badly decayed, and very black. One doubted whether to use post or porcelain jacket crown. The root responded at 15, however, and the porcelain jacket was placed, leaving pulp intact. The gum healed immediately after removal of the gold crown. No trouble in three years.

Case XII. Mr. E., age forty. Continued pain, soreness and considerable lingual swelling on roots of upper right second molar. Had kept patient awake several nights, becoming worse and apparently pointing on the palate. Had been previously diagnosed as acute alveolar abscess. The faradic current showed normal reaction, and the tooth yielded to treatment for a nodular deposit or serumal calculus high up on the palatal root.

NEW RESEARCHES INTO AMALGAMS, AND THEIR SIGNIFICANCE IN DENTAL PRACTICE.

By A. FENCHEL, Sc.D., L.D.S., Hamburg.

III. ON THE ELECTRIC CONDUCTIVITY OF THE PURE TIN-SILVER AMALGAMS.

IN my last publication ⁽¹⁾ it was demonstrated by the example of the pure tin-silver alloys how the specific volume may be used in the investigation of the hardened binary alloy.

To these investigations an emendation has to be added in regard to the citation of Charpy's "Études microscopiques des alliages métalliques." My reports had been made in accordance with Goerens' text-book on metallography. According to that book, Charpy noted eutectica up to 65 per cent. for all tin-silver alloys. In the meantime I have been able to study Charpy's essay in the original, and have found that Goerens' citation is wrong. Charpy first discusses the tin-silver curve of Gautier, which shows angles in the 40 per cent. and 70 per cent. silver. According to Charpy the hardness is considerable between 60 per cent. and 80 per cent. silver. At 70 per cent. silver Charpy notes a chemical combination whose crystals are isomorphous with those of silver, so that all alloys above 70 per cent. consist of isomorphous mixtures of that combination and pure silver crystals. This led Behrens to consider AgSn , Ag_4Sn , and Ag_3Sn as combinations. Consequently, according to Charpy, Ag_2Sn would be the combination, and AgSn , Ag_2Sn_3 , and AgSn_2 , mixtures of the eutecticon 5 per cent. and of the combination 65 per cent. In my last essay I have expressed my different opinion, giving the reasons why I assume a combination AgSn_2 and a eutecticon Ag_2Sn .

The present investigation concerns the electric conductivity of the pure tin-silver amalgams, and shows how this property may be used in determining the internal equilibrium of this ternary alloy. Before entering into the methods of their application and their usefulness, I shall describe the instruments which I have used in this investigation.

I take great pleasure in expressing my indebtedness to Professor Voller, director of the Physical State-Laboratory of Hamburg, who kindly permitted me to use the laboratories and the instruments of that institution. I am greatly indebted to Professors Classen and Martens and Drs. Jensen and Voegelé for much good advice, also to the librarian of the institute, Mr. Albert Portig, who facilitated my work by his untiring assistance.

For ascertaining the resistance of the amalgams, a Siemens-Halske measuring bridge was employed, constructed after the method of the so-called Wheatstone bridge. The method of experimenting is indicated in Fig. 1. The amalgam to be tested was placed in a glass tube of two millimeters in width (Fig. 1, X). In the ends a chemically pure iron wire was inserted, from which two communicating wires led to the bridge at the screw posts *d* and *e*. This measuring bridge serves for measuring resistances of from 0.0001 to 100,000,000 of Siemens' units. The scheme is as shown in Fig. 2.

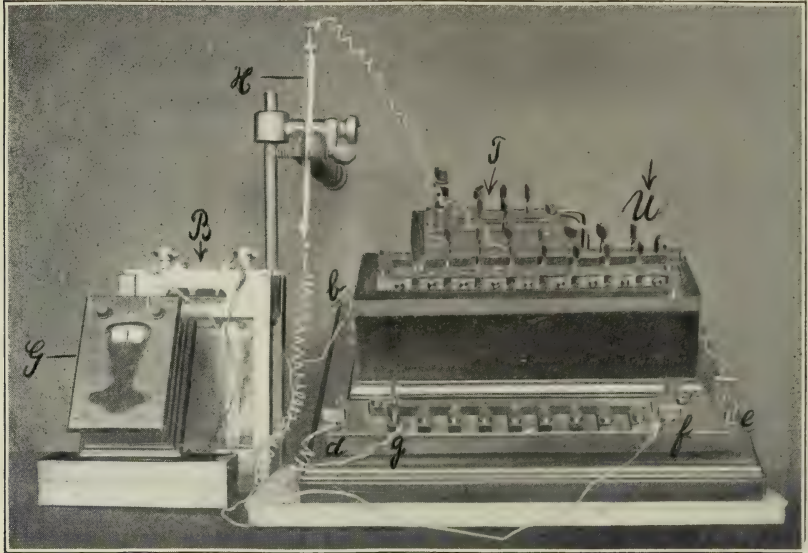
When the galvanometer (*G*, Fig. 1) stands at 0, we have (see diagram Fig. 2)

$X = A \times D/B$, whereby A , B , D indicate the comparative resistances lying in the respective branches, and X the resistance to be measured. In short, the un-

$X = A \times D/B$, that is, a known quantity.

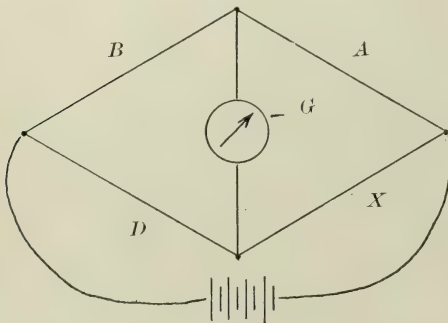
The diagram Fig. 3 shows this arrangement with the same lettering as the exter-

FIG. 1.



known to be measured is brought into relation to the known, A , B , D , and these are made to act upon the galvanometer G . As long as X/A is not equal to D/B , the galvanometer will throw. The resistance, A , is therefore to be

FIG. 2.



charged like a scale with more or less resistance until the galvanometer stands at 0. Then we have: $X/A = D/B$ or

nal view in Fig. 1. The galvanometer is connected with the screw posts b and c , the battery B , consisting of two storage cells, with f and g , and the resistance to be measured, X , with d and e . The main key on the bridge, which upon pressing connects the battery, is marked $T1$. While measuring, the resistance connected at A is varied until upon pressing the key $T1$ the galvanometer needle no longer throws. U is a commutator, which is of no significance for our measurements.

In order to measure a greater number of tubes filled with amalgam without much loss of time, I have constructed the experimenting device shown in Fig. 4, which takes the place of X in Figs. 1 and 3, and is composed of 12 tubes, X .

In the glass receptacle A , through twelve perforations of the lid B , twelve test tubes, X , were so inserted that the iron wires introduced touched the bottom of the vessel, this being covered with mercury to a height of one-half centi-

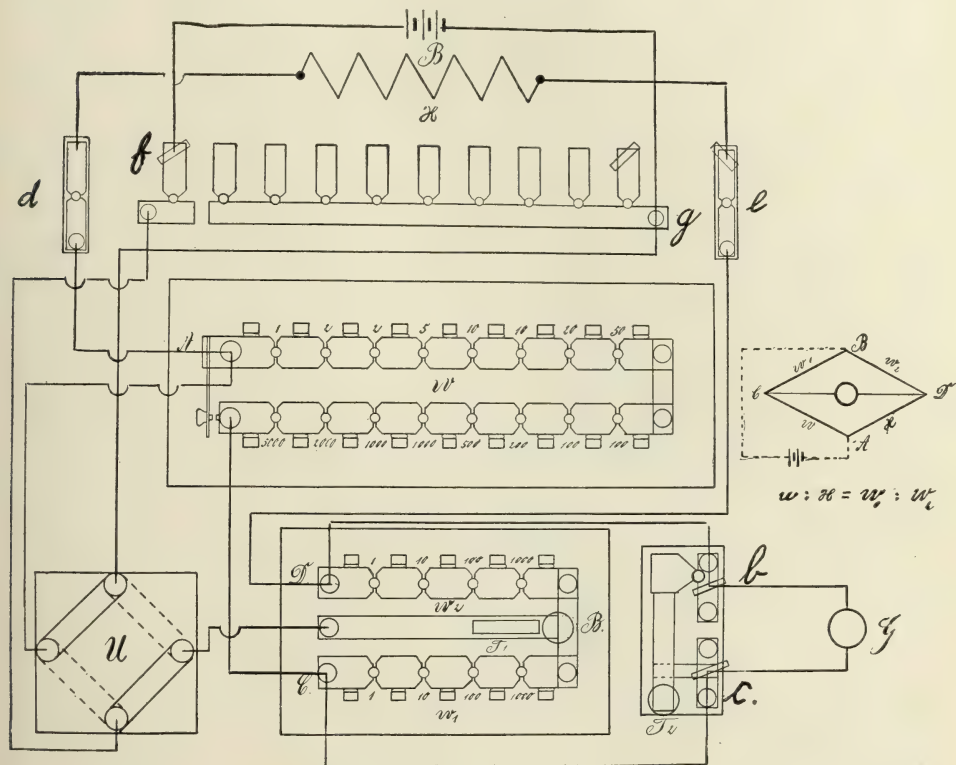
meter; thus a connection was established between all the objects to be tested and the chemically pure iron wire *C*, which was also immersed in the mercury, and was led by a connecting wire to the binding-post of the bridge.

The wire attached to the other end of the test tubes was bent twice at right

twelve amalgams took hardly ten minutes.

In metallurgy the property of electric conductivity has long been used in order to determine the internal conditions of alloys. Scrupulous tests have been made in this direction by Matthiesen ⁽²⁾ as early as 1860. Le Chatelier ⁽³⁾ was the

FIG. 3.



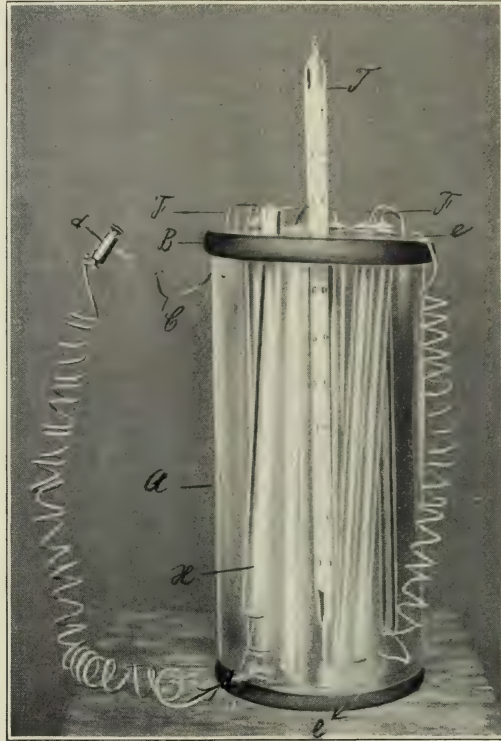
angles, as seen at F , so that its end might be immersed in a small bowl filled with mercury, which was fastened to the lid of the vessel. Such a vessel was attached in front of every amalgam tube. The wire e , leading from the binding-post e , was in every test submerged in the respective bowl of mercury in which the pole F of the amalgam tube to be tested was immersed, and the latter connected with the bridge by C , d , F , e . In this way, after some practice, the testing of

first who from the diagrams drawn after measurements drew conclusions as to the existence of combinations or eutectic mixtures between the metals tested. Roozeboom (*) then pointed out the significance of the difference in arrangement of the crystals forming the metal, which considerably influences the conductivity. These investigations are, for our purposes, of purely theoretical interest, and I reserve an explanation thereof for a future publication of my investigations on the in-

ternal behavior of the individual tin-silver amalgam groups with different contraction of mercury. At present I would show that the electric conductivity furnishes us with a means of tracing the slightest oscillations in the internal condition of amalgams up to their hardening.

with contact wires of chemically pure iron as described above. In order to avoid any disturbances arising from notable differences in temperature, the vessel A was filled with petroleum and controlled as to its temperature before measuring. For practical reasons this method was abandoned later on, and the measurements of

FIG. 4.



As test specimens eight different silver-tin amalgams were used, consisting of the combinations AgSn_3 , AgSn_2 , Ag_2Sn_3 , $\text{Ag}_9\text{Sn}_{11}$, AgSn , $\text{Ag}_{11}\text{Sn}_9$, Ag_3Sn_2 , Ag_2Sn . These alloys were mixed with mercury in the proportion N_5Hg_2 , "N" corresponding to the respective tin-silver amalgam used. In parts by weight this corresponds on an average to the proportion of 11 parts of filings to 8 parts of mercury.

The amalgam was packed in a warm, almost liquid condition into glass tubes of two millimeters in width and fitted

the alloys AgSn and Ag_2Sn , which at the conclusion of this paper are compared with the curves of contraction and expansion of the same alloys, have been made dry.

The present investigations fall short in one respect. They have been made at the Physical State-Laboratory of Hamburg, where, owing to the great demands made upon this institute, no thermostat could be placed at my disposal. Therefore no definite conclusions as to the behavior of the amalgams in the mouth can be drawn from the results of this investi-

gation. All my experiments from which I derive practical inferences are made at mouth temperature. The difference of fifteen degrees C. is an important factor in a substance of such low fusing-point as our amalgams.

Moreover, the coefficient of evaporation of the mercury at body heat is considerable, while at room temperature it is equal to 0. For the sake of comparison I made Brislee's ⁽⁶⁾ experiment for establishing the chemical equilibrium between mercury and gold in a vacuum at room temperature, and noted four weeks afterward that the mercury showed no loss in weight. I then left a vessel containing mercury 15.779 gm., of a surface of 2 cm. in diameter, standing uncovered in the thermostat at 36° C. for four weeks. The loss in weight amounted to 0.0075 gm., or $\frac{1}{4}$ mgm. per day. I then raised the temperature to 51° C., and after nine additional days noted a loss in weight of 0.009 gm., or 1 mgm. per day.

Incidentally I wish to point out the various exaggerations which have been made by various authors in regard to the evaporation of mercury at room temperature.

These figures certainly prove that in ascertaining the behavior of amalgams in the mouth the temperature plays a rôle, and that figures which have been obtained at room temperature require correction. I also consider this item as a mistake in Black's ⁽⁵⁾ experiments, and it may perhaps also explain the conspicuous differences between Black's and my own results. At the conclusion of this essay I have reproduced two comparative diagrams in order to demonstrate how in the same material the curves resulting from the electrometric measurements show great similarity with the curves of the specific gravity.

The tin-silver alloys used coincide approximately with Black's tin-silver alloys of 50 per cent. and 65 per cent. The discrepancy in our results is evident, and the diagrams V(A) and VI(A), in which Black's results have been noted collaterally, eloquently demonstrate this differ-

ence. Black found, for the 50 per cent. alloy, 2 points or 5 microns of expansion, and the same contraction for fresh filings, and 17 points or 45.5 microns of contraction, and 1 point = 2.5 microns of expansion for "aged" filings. I reduced these figures to one cubic centimeter, since I used this quantity for my measurements, while Black's tables show three-eighths of an inch = 1 c.dm. The surface of one c.cm. equals 100 c.mm., so that the area of one point (= 2.5 microns = $\frac{1}{400}$ mm.) in every one of the three directions of the cube, enlarged or reduced the cube by $\frac{3 \times 100}{400}$ c.mm. =

0.75 c.mm., or by 0.75 per mille. Hence Black found for 50 per cent. tin-silver alloy 1.5 per mille contraction and 1.5 per mille expansion for fresh filings, and 12.75 per mille contraction and 0.75 per mille expansion for annealed. These measurements, as far as Black states in his communication in the DENTAL Cosmos for August 1895, pp. 648-652, extended over twenty days. My experiments, however, show for the alloy AgSn (47.7Ag52.3Sn) 40 per mille expansion to the 14th day, falling to 10 per mille up to the 16th day, rising again to 35 per mille up to the 60th day, and 32.5 per mille at the 120th day.

Black found, for the 65 per cent. silver alloy, 0 per mille contraction and 0.75 per mille expansion for fresh filings, and 7.5 per mille contraction and 0 per mille expansion for annealed filings. My diagram shows 45 per mille expansion on the 4th day, 40 per mille on the 5th day, rising to 52.5 per mille up to the 12th day, falling to 50 per mille on the 16th day, and rising fairly steadily to 67.5 per mille up to the 60th day. The symmetry between the electrometric and the volumetric curve strongly argues for its exactness.

At any rate, this considerable discrepancy between the results obtained by Black and by myself demands an explanation. I shall therefore not spare the trouble of investigating at room temperature, etc., in a forthcoming publication of my respective volumetric examinations, a

simultaneous parallel table exactly after Black's indications, in order to discover the causes of our differences.

After this deviation it now remains for me to explain my tables and charts.

Series I represents the resistances found during the measurement in 1/1000 of an ohm. The temperature is indicated. At times the amalgam to be measured was in such internal commotion that the galvanometer could not be brought to a standstill; the indicator jumped to and fro by jerks. Wherever these oscillations are marked, the figure found indicates only an approximate value. When the oscillations were too strong the measurements had to be omitted.

Series II shows the above figures in diagram form, and indicates the respective proportion of the different amalgams among themselves.

Series III shows the diagram for each individual material in 17 days. The days on which no measurements could be made on account of the strong oscillations of the galvanometer are marked by a double arrow and the letter "u" (*unmoeglich*, impossible).

Series IV is a diagram of the maximal and minimal resistance of each amalgam and the amount of its oscillations.

Finally come the diagrams of resistances taken dry, V(A) for AgSn and VI(A) for Ag₂Sn, with the comparative diagrams of their specific volumes, V(B) and VI(B), the significance of which has been previously discussed.

The results of these diagrams are different from those formerly obtained with petroleum. I consider dry measurements far more exact, and shall therefore in the future probably always take dry measurements.

In these investigations it must be taken into consideration that amalgams are the most capricious of all metal alloys, and that I am obliged to first establish the technique of these investigations. This

is not, however, intended as a criticism of Black's methods. At the time when Black published his investigations, no others were in existence which in importance even approached those of Black. He restricted himself to the investigation of the surface of the amalgams, which he carried out with scientific exactness. It is self-evident, however, that such an investigation restricted to the surface will never explain the nature of the internal constituency of the amalgams, the recognition of which is our aim.

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6. BRISLEE, *Dental Record*, June 1907.

Tables and Charts.

SERIES I.

Tubes I to IV tested June 15, 1908. Tubes V to VIII tested June 16, 1908. Measurements begun June 17, 1908, 12 M.

Test 1. June 17th, 12 M. Temp. 22° C.

	Ohm.	Ohm.
I. Dry	0.362; in petroleum,	0.450
II. " "	0.220; " "	0.302

Petroleum filled in.

Test 2. June 17th, 2 P.M. Temp. 22.9° C.

	Ohm.
I.	0.560
II.	0.455
III.	0.555
IV.	0.538
V.	0.692
VI.	0.532—oscillates to 0.543
VII.	0.690
VIII.	0.710

Test 3. June 17th, 2.25 P.M. Temp. 23° C.

	Ohm.	
I.	0.811—oscillates strongly	
II.	0.691	
III.	0.790	“ slightly
IV.	0.795	
V.	0.940	
VI.	0.860	“ slightly
VII.	0.980	
VIII.	0.995	

Test 4. June 18th, 8.30 A.M. Temp. 22° C.

	Ohm.	Ohm.
I.	0.840—oscillates to 0.920	
II.	0.720	“ “ 0.760
III.	0.850	“ slightly
IV.	0.784	“ “
V.	0.910	“ to 0.902
VI.	0.652	“ “ 0.754
VII.	0.762	“ “ 0.794
VIII.	Immeasurable.*	

Test 5, a. June 19th, 9 A.M. Temp. 20.9° C.

	Ohm.	
I.	0.937—oscillates slightly	
II.	0.897	“ to 0.865 ohm
III.	0.847	“ “ 0.856 “
IV.	0.881	“ very slightly, hardly perceptibly
V.	0.972	“ more strongly than IV
VI.	1.025	
VII.	0.865	“
VIII.	1.060	“ very strongly; immeasurable

Test 5, b. June 20th, 9 A.M. Temp. 20.9° C.

	Ohm.	
I.	0.937—oscillates slightly	
II.	0.897	“ to 0.865
III.	0.847	“ “ 0.856
IV.	0.881	“ very slightly, hardly perceptibly
V.	0.972	“ more strongly than IV
VI.	1.025	
VII.	0.865	
VIII.	1.060	“ very strongly; immeasurable

* VIII shows extreme deviations, to beyond 10,000 ohms, which are immeasurable and change from right to left several times per minute. I succeeded several times at between 0.500 and 9.000 ohms in securing rest for a moment.

Tests 6, 7. June 20th. 9 A.M. and 10 A.M. Temp. 21.3° C. and 21.5° C.

	Ohm.	Ohm.
I.	0.807	I. 0.783
II.	0.757	II. 0.757
III.	0.735	III. 0.743
IV.	0.750	IV. 0.750
V.	0.705	V. 0.705
VI.	0.910	VI. 0.920
VII.	0.730	VII. 0.740
VIII.	Immeasurable on account of violent oscillations	

Test 8. June 20th, 1 P.M. Temp. 22° C.

	Ohm.	
I.	0.797—oscillates slightly	
II.	0.742	“ “
III.	0.728	“ “
IV.	0.660	“ “
V.	0.720	“ “
VI.	0.760	“ strongly
VII.	0.820	“ “
VIII.	0.685	“ very strongly, to 1.635

Test 9. June 22d, 10.30 P.M. Temp. 20° C.

	Ohm.	
I.	0.432	
II.	0.370—oscillates slightly	
III.	0.212	“ “
IV.	0.257	“ very slightly
V.	0.797	“ “
VI.	0.520	“ slightly
VII.	0.357	“ “
VIII.	Immeasurable; oscillates very strongly	

Test 10. June 23d, 11 A.M. Temp. 18.8° C.

	Ohm.	
I.	0.461—oscillates slightly	
II.	0.361	
III.	0.310	“ strongly
IV.	0.245	“ slightly
V.	0.724	“ very strongly
VI.	0.510	“ slightly
VII.	0.250	
VIII.	0.433	“ strongly

Test 11. June 24th, 9 A.M. Temp. 19° C.

	Ohm.	
I.	0.471	
II.	0.375	
III.	0.550—oscillates strongly	
IV.	0.269	
V.	0.702	“ “
VI.	0.765	“ “
VII.	0.260	
VIII.	0.450	“ “

Test 12. June 25th, 9.15 A.M. Temp. 19.5° C.

	Ohm.
I.	0.441
II.	0.382
III.	0.507
IV.	0.267
V.	0.750—oscillates strongly
VI.	0.272 “ slightly
VII.	0.263
VIII.	Immeasurable; oscillates very strongly

Test 13. June 26th, 8.30 A.M. Temp. 19.6° C.

	Ohm.
I.	0.500—oscillates very strongly
II.	0.475 “ strongly
III.	0.550 “ “
IV.	0.360 “ “
V.	0.600 “ “
VI.	0.355 “ “
VII.	0.303 “ slightly
VIII.	0.450 to 9704—oscillates so strongly that measurement is impossible

Test 14. June 27th, 9.15 A.M. Temp. 19.6° C.

	Ohm.
I.	0.515
II.	0.470—oscillates slightly
III.	0.544 “ “
IV.	0.435 “ “
V.	0.800 “ very strongly
VI.	0.360 “ “
VII.	0.287 “ strongly
VIII.	2.085 “ “

Test 15. June 29th, 1.30 P.M. Temp. 20.4° C.

	Ohm.
I.	0.485—oscillates slightly
II.	0.425 “ “
III.	0.345 “ “
IV.	0.293 “ “
V.	0.563 “ “
VI.	0.390 “ “
VII.	0.317 “ “
VIII.	1.110 “ strongly

Test 16. July 1st. Temp. 19.5° C.

	Ohm.
I.	0.702—oscillates
II.	0.657 “
III.	0.350 “ strongly
IV.	0.170 “ “
V.	0.520 “ very slightly
VI.	0.250 “ slightly
VII.	0.295 “
VIII.	0.235 “ “

Test 17. July 4th, 11.30 A.M. Temp. (?)

	Ohm.
I.	0.885—oscillates
II.	0.720 “
III.	Measurements impossible on account of strong oscillation
IV.	
V.	
VI.	
VII.	
VIII.	

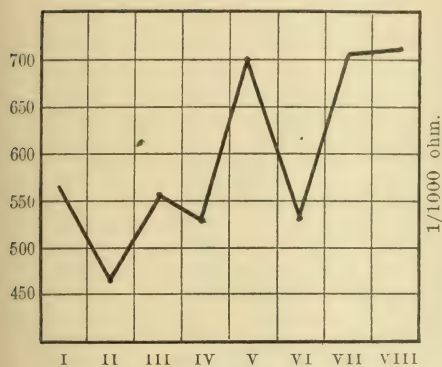
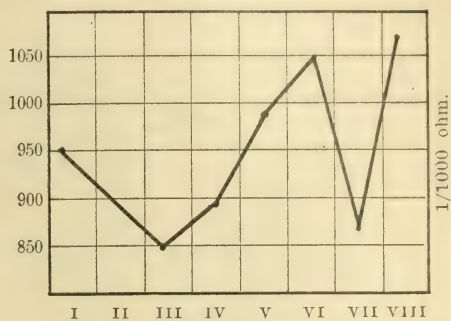
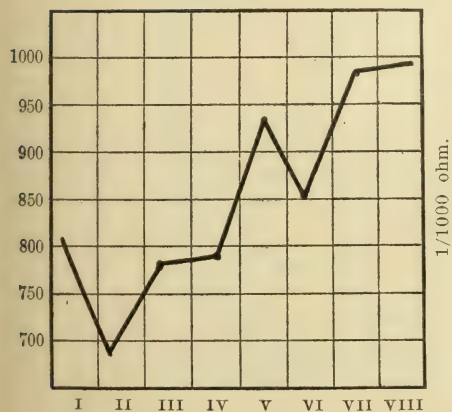
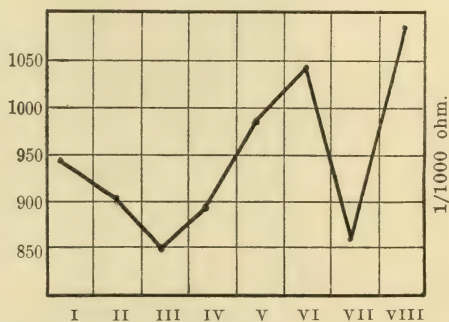
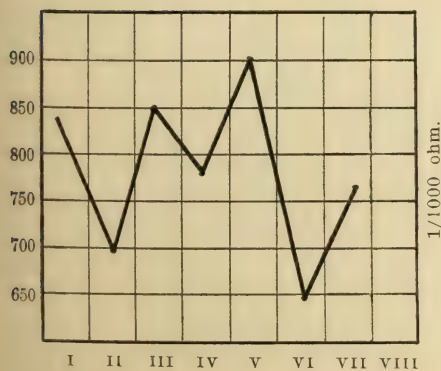
Test 18. July 6th, 12.40 P.M. Temp. 20° C.

	Ohm.
I.	1.175—oscillates very strongly
II.	1.500 “ “ “
III.	1.915 “ “ “
IV.	0.6 to 1.5 “ “ “
V.	1.875 “ “ “
VI.	0.765 “ “ “
VII.	0.615 “ “ “
VIII.	0.615 “ “ “

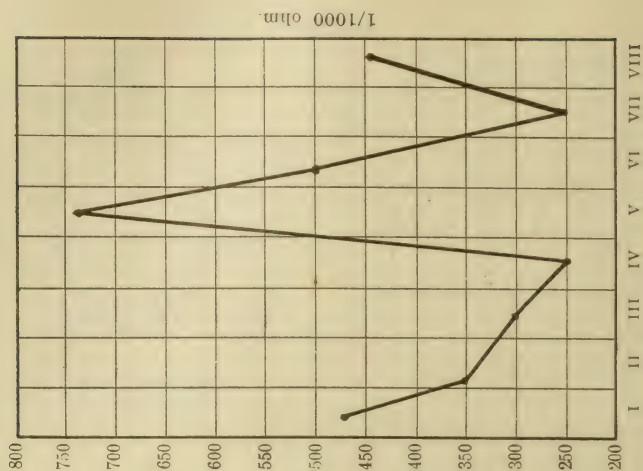
Test 19. July 7th, 9 A.M. Temp. 18° C.

	Ohm.
I.	Measurements impossible on account of strong oscillation
II.	
III.	
IV.	
V.	
VI.	0.755—oscillates
VII.	0.230 “ slightly
VIII.	0.273 “ very slightly

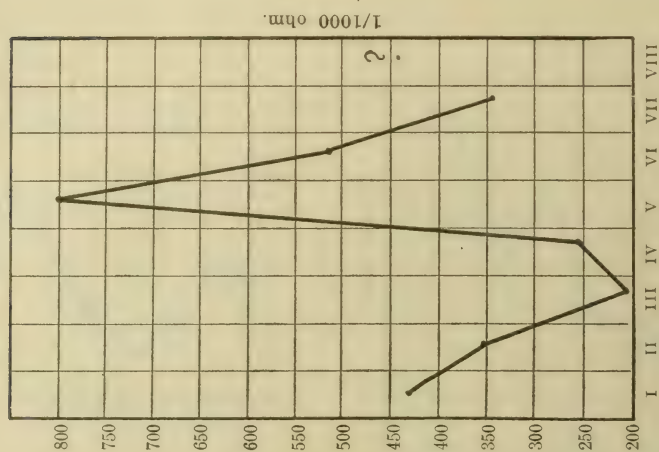
SERIES II.

Test 2.*Test 5. (a)**Test 3.**Test 5. (b)**Test 4.**Test 6.*

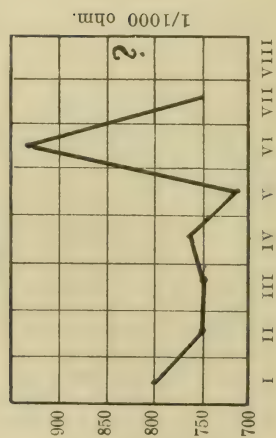
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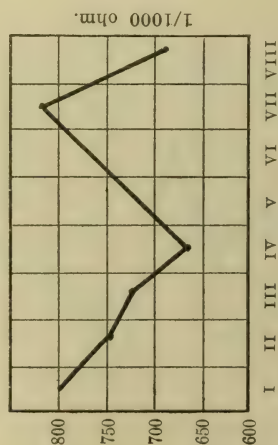
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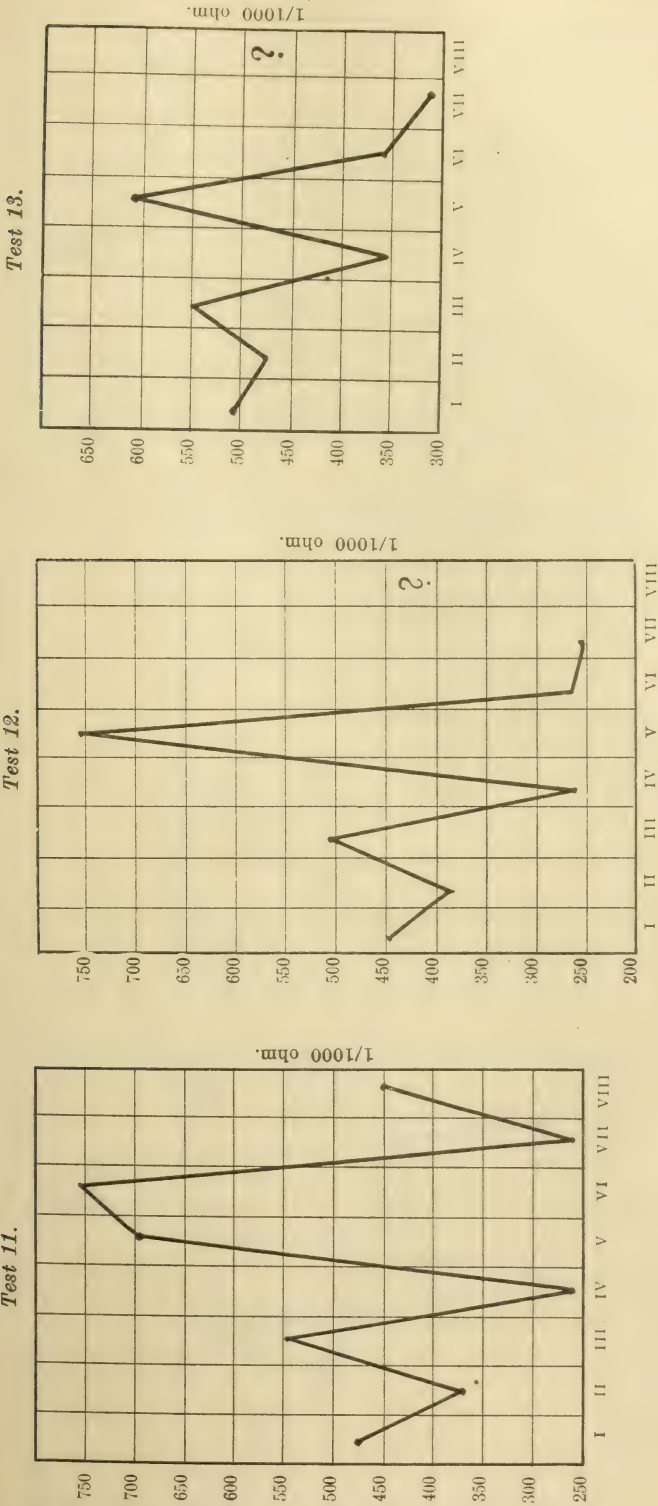


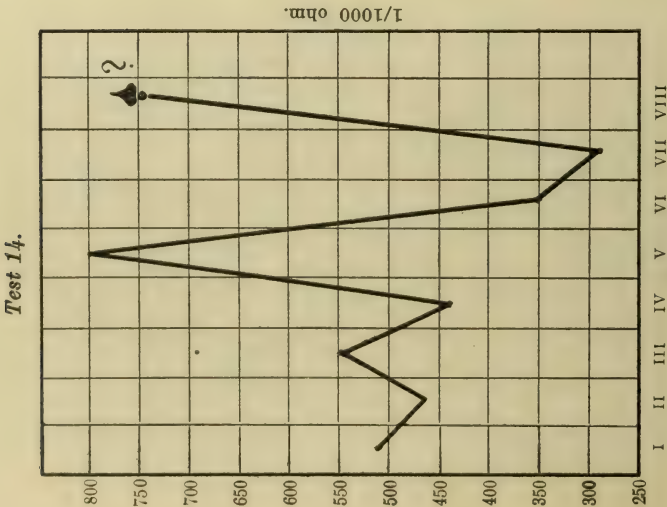
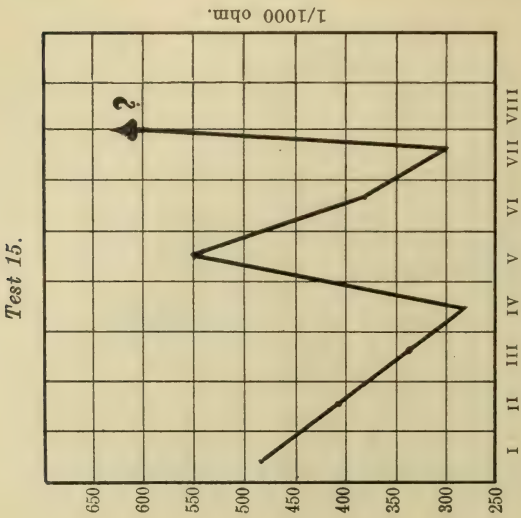
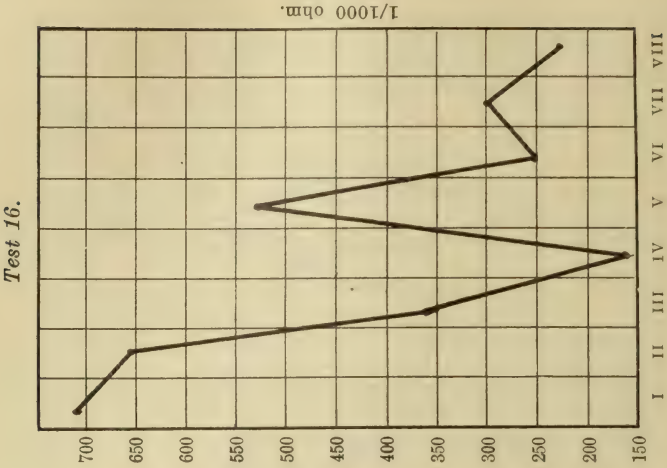
Test 7.



Test 8.

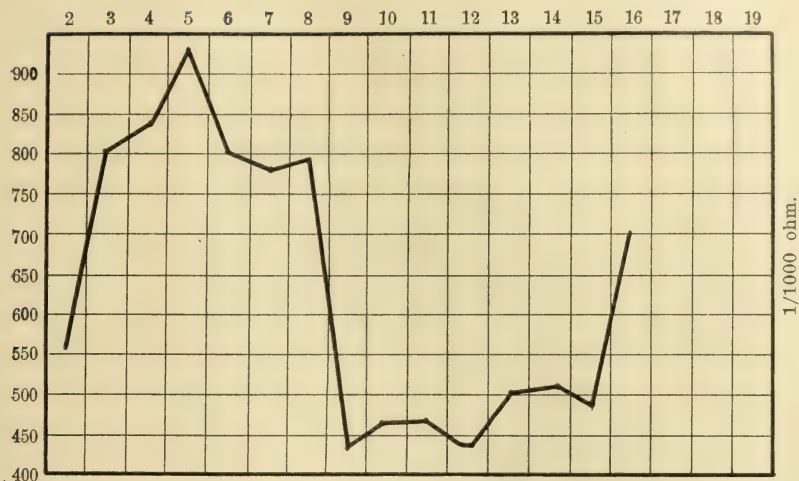




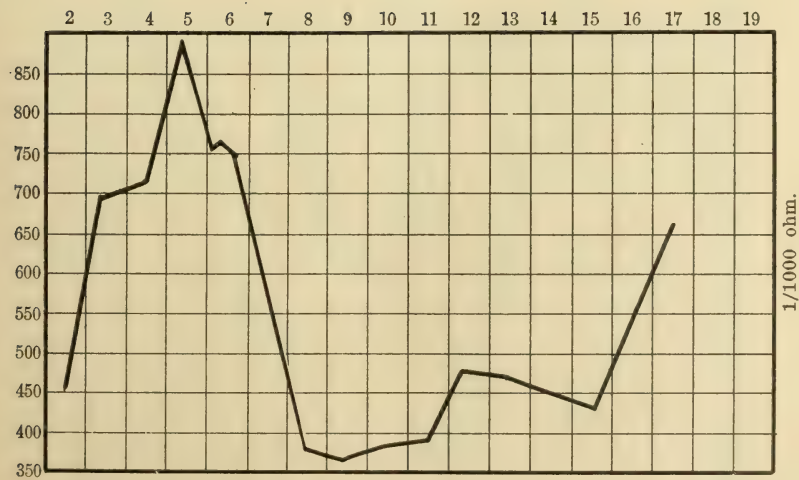


SERIES III.

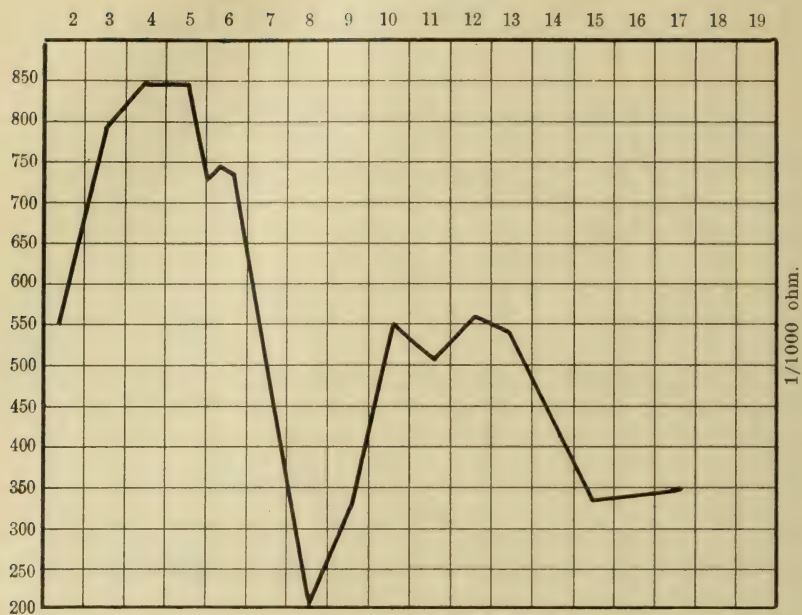
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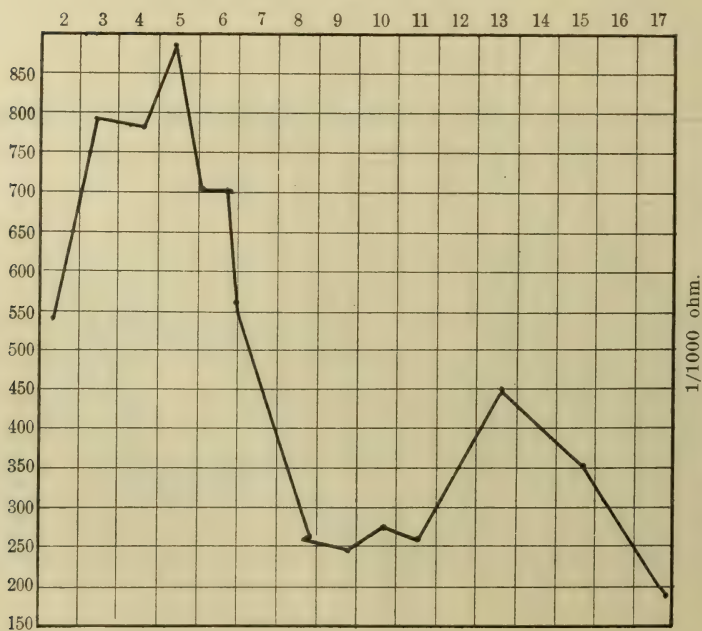
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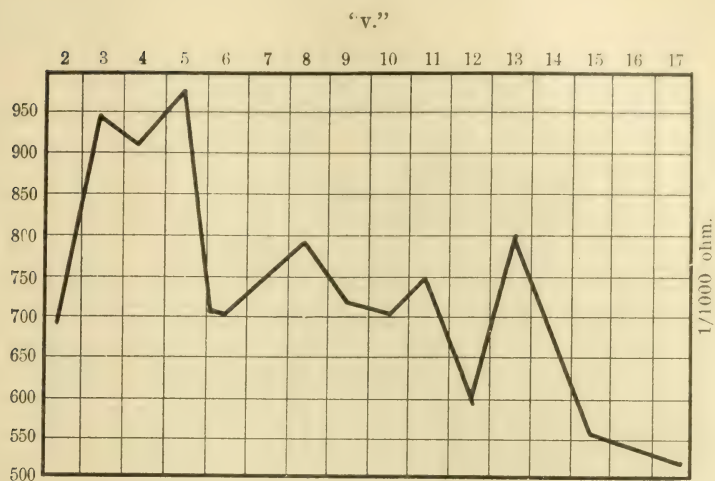


"III."

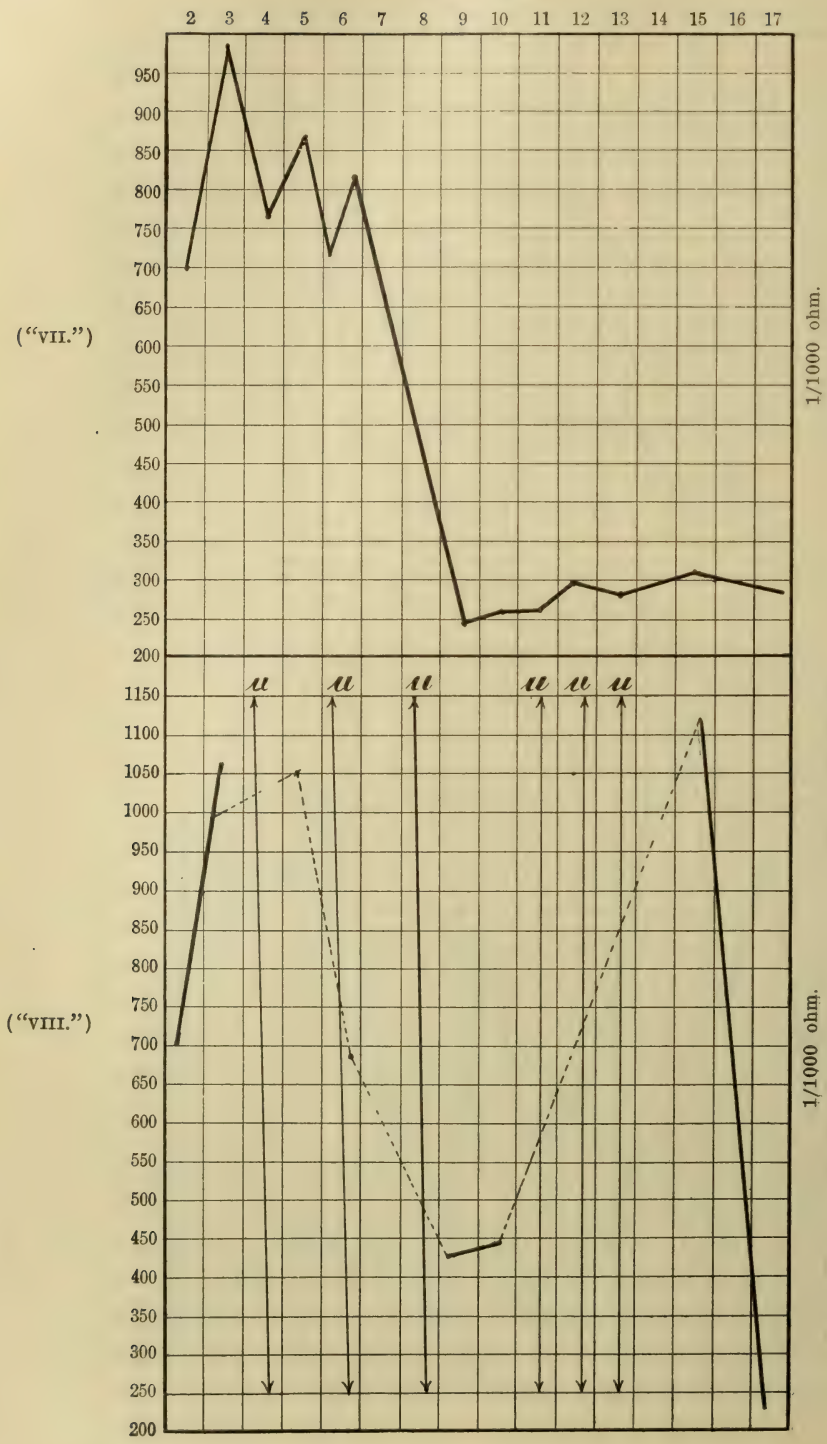


"IV."



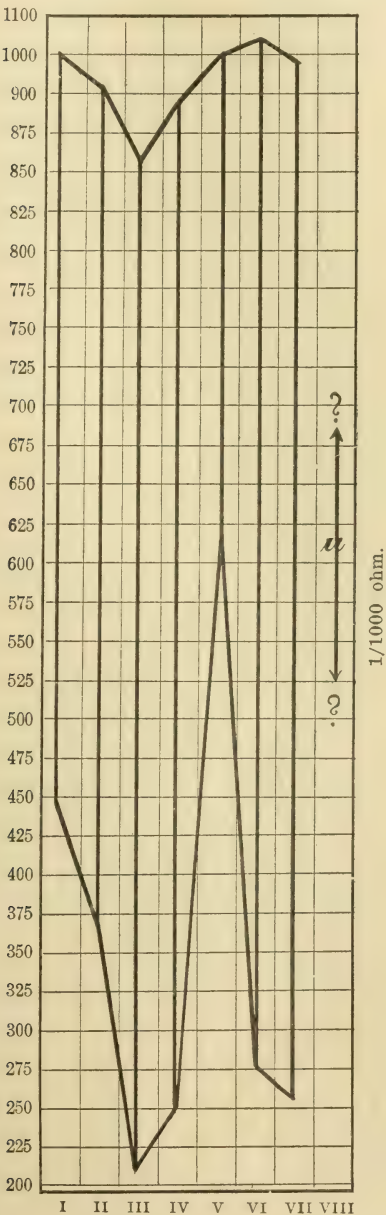


"VII," "VIII."

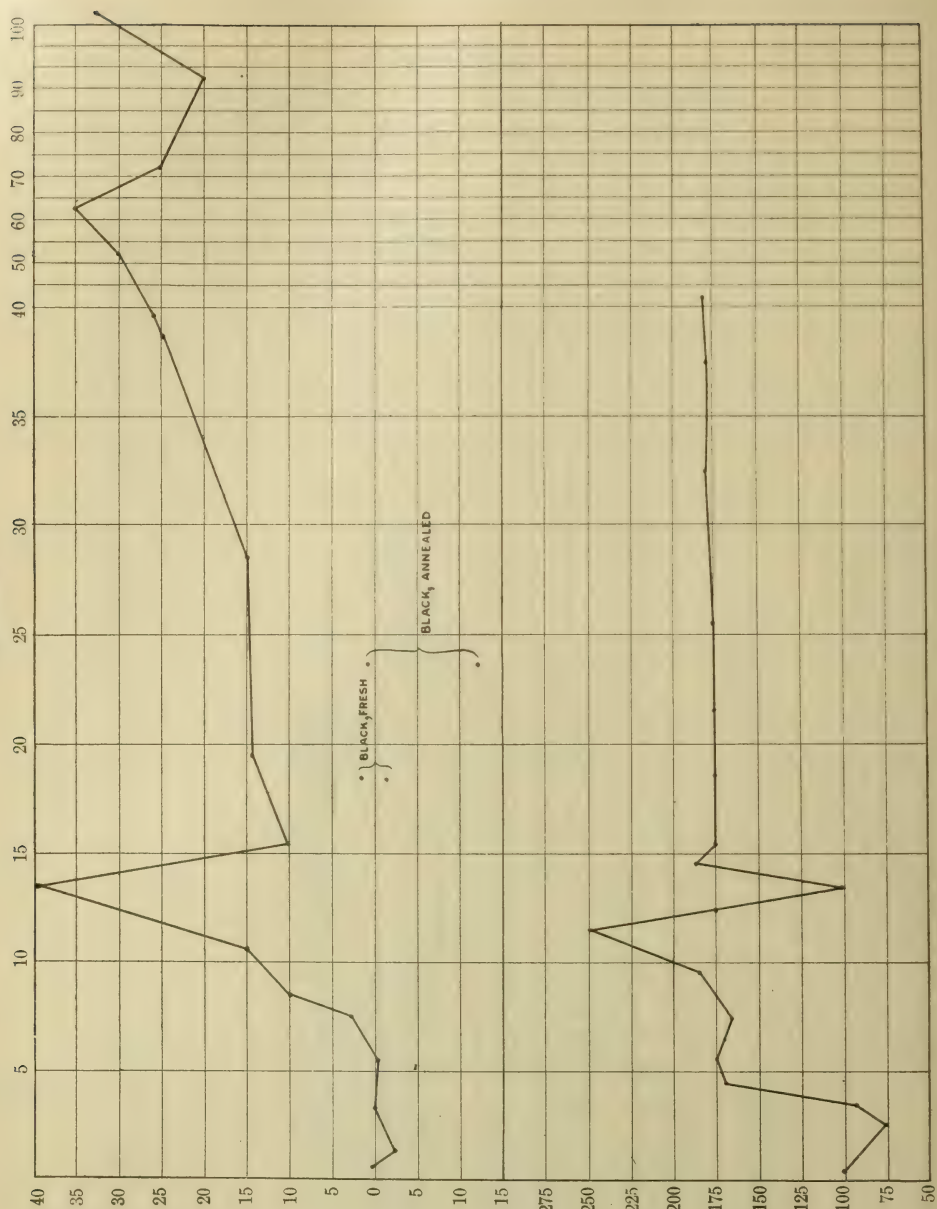


SERIES IV.

Correlation of "I" to "VIII" in ten days.
Tests 1 to 12. Highest and lowest resistance.
("VIII" excluded.) June 15-24, 1908.



SERIES V.



Amalgam "V"—
(AgSn)₃Hg₂.

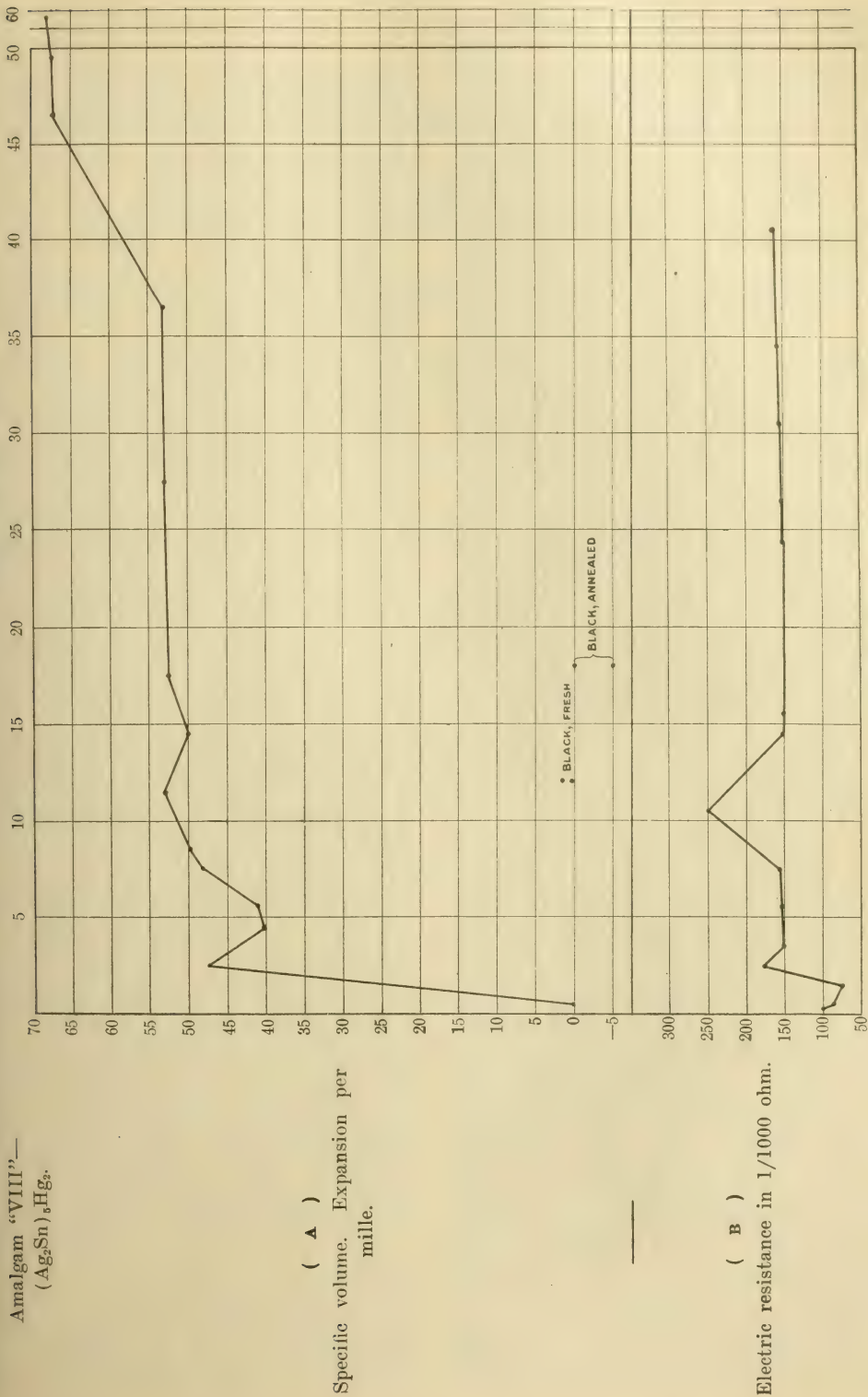
(A)

Specific volume. Contraction and expansion per mille.

(B)

Electric resistance in 1/1000 ohm.

SERIES VI.



WOULD THE MEDICAL DEGREE ADD TO THE PROFESSIONAL AND SOCIAL STANDING OF THE DENTIST?

By EDWIN T. DARBY, M.D., D.D.S., Philadelphia, Pa.

(Read before the First District Dental Society of the State of New York, at its regular monthly meeting, November 10, 1908.)

THE question which I have asked is not new, but one which has agitated the profession since it assumed the dignity of a profession. Before the establishment of dental colleges many progressive men who selected the calling of dentistry as a means of livelihood attended courses of instruction in medical schools, and many of them took the medical degree. Most of the men whose names are historic in dentistry were graduates of medicine. It was men of this progressive spirit who were most active in founding dental colleges, and to them we are indebted for the zeal which characterized the early endeavors which made the profession what it was sixty or more years ago.

It is not my purpose tonight to discuss the question whether dentistry is a specialty of medicine or whether it is an art and science independent of the medical profession. Much has been written and spoken in the past relative to this phase of the subject. Were I to express an individual opinion, I should take the ground that dentistry is not a specialty of medicine, but a distinct and separate profession, affiliated along certain lines with the older one of medicine. Notwithstanding this, there are many who have selected dentistry as their calling who seem dissatisfied with the dental degree, and are restless under the imputation that the dental degree does not carry with it sufficient professional dignity and social standing, and would aspire to one which they imagine would give them greater influence in the public mind. The notion that law, divinity,

and medicine are the only professional callings to be worshiped by the candidate for respectability has done much to disturb the peace of mind of many students and practitioners of dentistry. There appeared some thirty or more years ago an editorial in the *Medical Times* of Philadelphia, which caused not a little discussion and some bitterness on the part of dentists, because it ridiculed the profession for seeming to assume a position coequal with medicine. In reply to some comments upon the editorial the writer of the original says:

Whether our explanation of the exceeding sensitiveness of our friends the dentists be or be not correct, the fact remains that dentistry is not looked upon at all by the medical profession as in the slightest degree coequal with medicine; that the degree of doctor of dental surgery is viewed with a great deal of amusement and a little vexation, and that the claim that dentistry is a branch or specialty of medicine is generally met by internal cachinnations, whatever external behavior the laws of politeness may enforce. These may be hard things to hear, but we hope our dental friends will not be angry. They are not the opinions of the *Times* or its editors, but are the simple facts of the case, facts which it behooves those who wish to see dentistry placed upon a higher plane to recognize. We are not now speaking of dentists, but of the dental profession. There are many dentists of the highest culture and the most worthy social characteristics, precisely as there are such men in all of the higher walks of life, but certainly, if dentistry even in the abstract is worthy of a position as a medical specialty, the living concrete dentistry can only gain such honor by a complete reorganization of the profession. The

dentist formerly acquired his art in the office of his predecessor, and it was not considered necessary for him to study in any more extensive sphere. As time went on, the lucrativeness of the calling attracted more and more able and cultured men, aspirations rose higher and higher, dentists began to demand a more extensive education, and dental colleges were founded. But now another step is being attempted, and claim is put forward for the recognition of dentistry as a medical specialty.

In considering this claim, the great difference between dentistry and such real specialties as ophthalmology must not be lost sight of. In the first place, dentistry originated, or at least has grown up, entirely outside of the medical profession, while the true specialties have originated and been cultivated solely inside the profession. In the second place, dentistry constantly asserts itself as something outside of the medical profession, while the specialties do not. Every dentist announces himself as such upon his door-plate or windowsill, while a ban is laid upon the man who labels himself in the same way as an oculist or aurist. In the third place, the dental profession is, by its actions, saying to the world day in and day out that a general medical culture is of no use, or at least is not necessary to the dentist, while the specialist insists that before special studies are undertaken the candidate must have had a thorough general medical education.

The dental colleges have been a great aid to the dental profession, and, indeed, whatever claim dentistry really has to be called a profession rests almost exclusively upon their labors. Yet they are an insuperable bar to its ever becoming a medical specialty, and the degree of D.D.S. is the ban of a partial culture which must shut out from the medical ranks everyone who wears no other insignia, a fact of which the dentists seem painfully aware, since as soon as one of them takes a degree in medicine the D.D.S. disappears in a twinkling from door-plate and window shutter. So long as the dental profession, by their deeds, say that such half-culture is all that is necessary for a dentist, why should the members complain if the world and the *Times* agree with them, and assign to dentistry the position which it at present holds?

The above is, perhaps, a fair, if not an exact estimate of the feeling of the medical profession as it existed thirty years ago, and who shall say that the

same feeling is not general today? Our sensibilities resent the imputation that we are not coequal with other specialties in medicine, because we are conscious that the field in which we work is as large as or even larger than that in which many specialists labor. The medical student spends four years in college, and after graduation may select one or four specialties, and practice as many as he pleases. The student of dentistry spends three years in college and after graduation must confine himself to one. Can it be said that the dental graduate is not infinitely better qualified to practice his own special calling, than the medical graduate any of the specialties which he is at liberty to select? Had the medical schools of sixty years ago established dental chairs in their curriculum, and had dental colleges not been founded, it is questionable whether the dental profession would not have occupied a place far inferior to its present one.

There are those who regard the founding of dental schools as a mistake, and are of the opinion that had the medical schools of sixty or seventy years ago established dental chairs in connection with the course of study prescribed, the dental profession would have occupied a better place than at present.

It is of course difficult to say just what its status would have been, but it is certain that the dentist would have been less thoroughly educated in the branches which have qualified him to practice dentistry as we know it today. Of one thing we may be certain—he would have acquired much more of the “speculative physiology, false pathology, and empirical therapeutics of the time than he did in the dental college course.” He would undoubtedly have learned more of general anatomy, but less of special anatomy of those regions which are most intimately associated with the parts upon which he devotes his attention as a dental practitioner.

The dental schools from the outset were far in advance of the medical schools of former years in that they have always required personal practical work in clinic and laboratory, whereas until

quite recently medical instruction—except in the dissecting room—has been confined to didactic teaching with no bedside instruction, no laboratory requirement, and little or no microscopical or bacteriological investigation.

Dr. M. L. Rhein, in a recent paper on dental education (*Journ. Amer. Med. Assoc.*, July 2, 1908), while admitting that "On account of the benighted biology, pathology, and chemical physiology of that time, the dentist was well able to hold his own," contends that the time has now arrived for a closing of the breach between medicine and dentistry, and that "the dentist of the future must be first of all fully grounded in the knowledge of medicine." As a time-saving plan he suggests that instead of two separate courses in medicine and dentistry there shall be a combination course in which the dental student shall take his place with the regular medical student and in addition devote a certain portion of his time to dental technique; that he shall work twelve months instead of eight in each year and take the didactic dental course in the intervals between the medical terms. If thus handicapped with extra work, and unrefreshed by a summer's rest, he is able to pass all the required medical examinations and secure his medical degree, a fifth year is to be required, "devoted entirely to the dental infirmary, and would enable the theoretically perfect student to test his knowledge and skill by practice. . . . The degree in dentistry would be granted only after the candidate had demonstrated in the infirmary his ability to put in practice the principles which he has been taught."

The plan presents many practical difficulties. The medical course in most of the reputable schools of America is an exacting one, requiring four years of eight or nine months each, and an entrance requirement which would of itself debar many men who had selected dentistry as their calling, from entering upon such a course of study. Furthermore, a lengthening of the medical course to five years is impending, with additional entrance requirement demand-

ing a degree in art or science. Before the candidate for dental practice could enter upon his life-work he must have spent four years in the department of arts, four or five years in the medical school, and at least one or two in the dental school—ten years of his time before he is legally qualified to enter upon the practice of his profession. To this may be added a period of two years before he has become sufficiently established to maintain himself financially. An editorial in the *Dental Brief* for October 1908, says:

The question at once arises, What rewards has dentistry as a profession to offer for all this expenditure of time, labor, and money? It is a laborious and exacting profession, in which those having a fair degree of skill and endowed with the personal qualities requisite for attracting and retaining a *clientèle* can make a comfortable livelihood, and with thrift and good fortune acquire a moderate competence for old age, but it is a profession which, unlike law and medicine, offers no great prizes in fees or official position, and which, as compared with either, is socially at a disadvantage. For an end relatively so unrewardful how can men be expected to enter upon a novitiate so costly, laborious, and time-consuming, when for the same effort expended in other directions there are possibilities of so much greater returns? Except in rare instances, of which Miller was the most notable, the graduates of the great universities holding degrees earned by actual attendance have not entered the dental profession in the past, and there is not much probability that in any considerable numbers they will do so in the future. Hence, in the future, as in the past, the world's work, so far as dentistry is concerned, must be done without them.

Fortunately for the world and for dentistry, their aid, however valuable it might be, is not indispensable. Under an educational system admittedly imperfect but steadily advancing, a body of practitioners has grown up embracing thousands who, although holding only the dental degree, are at least as skilled and successful in their special field as are medical practitioners in any other department of the healing art, and among whom are many who by original research have made valuable contributions to the development of dentistry as a science.

The opportunities for the study of the underlying principles of general medicine now

placed at the command of the student in any well-organized dental school are ample for his needs in what by usage and by law is recognized as his legitimate field of practice, namely, the teeth and their immediately associated parts. In the dental course he is taught all that is now known regarding the etiology and pathology of the diseases which as a dentist he is called upon to treat; no medical course can teach him more. If he desires to learn more by original research, the dental course has placed the means at his command. He has been given an adequate knowledge of anatomy, physiology, and pathology, and has been taught the use of the microscope, methods of bacteriological investigation, and chemical analysis. As a dental student he has not become an expert and master in scientific research, neither would he as a medical student; but he has the tools, and all that is needed is the inclination and native ability to perfect himself in their use. If he has neither the inclination nor the ability, he may multiply his college degrees, but he will never by scientific research make "knowledge grow from more to more," however much he may add to the health and comfort of his patients by his services as a plain, everyday practitioner.

Broad culture and manysidedness are beautiful things to contemplate, but, after all, it is the men of mediocre attainment who have done the hard work of the world. Desirable as a well-rounded medical education would be for the dentist, it is questionable whether the time and money expended to attain it would be a good investment. At the present time the dental schools of

America embrace in their curricula about all that it is necessary for the dentist to know to practice successfully his profession. Especially is this true of dental schools affiliated with universities having medical departments in which the dental and medical students are taught in common many of the branches. If, however, the student or practitioner wishes to dig deeper into the sciences, the whole field is open to him. There is ample opportunity for him to do original research work in connection with his own specialty. The field of oral surgery has few laborers in it, and the demand for such service is increasingly greater as the value of such special surgery is recognized. Again, it is questionable whether the medically educated dentist would command greater respect or professional standing with the medical practitioner or the public at large because he held the medical degree. Other things being equal, the medical practitioner does not select the medically educated man for his family dentist, nor does the community stop to inquire whether the dentist whom they wish to consult has one or many titles affixed to his name. All that they wish to know is whether he be skilful in his specialty.

As to his social standing, this is a matter outside his calling. If he has social instinct and is socially inclined and his reputation is not bad, he will be recognized upon his merits and not because he has academic or university degrees.

SOME PHASES OF THE CASTING PROCESS.

By C. S. VAN HORN, D.D.S., Bloomsburg, Pa.

(Read before the Lycoming Dental Society, at its ninth annual meeting, Williamsport, Pa., December 17, 1908.)

SPONTANEITY is rarely an important consideration in great achievements. From a slow, oftentimes tedious and wearisome process, accompanied by laborious work, diligent study, untiring energy, and dogged persistence, our great advancements result. Nor are great achievements the result of a single mind.

Evolution does not recognize spontaneity as a potent factor either in physiologic or psychic development, but rather correlates various processes, recognizing the relation of the consequent to the antecedent. And since great advancements are largely evolutionary, we must, it seems to me, take rational cognition of the various antecedents. What was the previous state?—what alkahest has been wrought out through the persistence of this mind or that?—to whom are we indebted and why? It is a serious and oftentimes colossal problem to estimate, pecuniarily, the value of achievements, for there may be and usually is woven into the finished fabric so much warp and woof of the antecedent variety that the drawing of lines of priority becomes largely conjectural. We are so dependent one on the other, so bound together and interlaced by thought and action, that to become a single, unsupported, unassisted entity, without regard for the erstwhile *was* and the present *is*, becomes, when indulged in, a pitiable attempt at egotistical pedantry.

That we must and should recognize the blazed trail is clearly apparent, but we should not regard it as the main thoroughfare, divergence from which means destruction; for tramping only along the same path tends simply to establish a

well-worn road and to make of the pedestrians mere echoes.

The main object, however, of this paper is not to philosophize but to discuss some of the phases of the casting process as applied to dentistry.

A rational method whereby molten metal may be made to occupy a space formerly occupied by a plastic disappearing pattern was, through an evolutionary process, brought prominently to light by Dr. Ollendorf as a means of casting dentures and bridges, and subsequently by Dr. Taggart as a means of restoring lost tooth-structures by inlays. Both these men gave us rather crude apparatus, and many other men, whose consuming desire seems to incline perceptibly in the direction of lust of pecuniary gain, have rushed into a wide open market with still cruder devices for casting anything from a bunch of roses to a bridge with many spans, while crude investments, still cruder pattern waxes, et cetera, are like unto the birds of the air. Herbert Spencer says, "The human race, though a gregarious race, has ever been, and still is, a predatory race." I wonder if Spencer knew? But it is at this time unnecessary to go into extended detail respecting either the apparatus or the method, as all are perfectly familiar with both. I shall therefore confine myself more especially to the utilitarian phase of the process and to the technique, assuming that all readers are in accord with the inlay principle, are intelligently using it in their practice in conjunction with the other good methods at our command, and are not governed by narrowness or prejudice in the selection of either methods or

materials in dental restoration. Should there by chance be any who are not in tune with my harp, I have simply this to say: I bear them no enmity; commiseration best expresses my feelings toward them and their *clientèle*.

INLAYS.

It seems to be rather generally conceded that the inlay principle of dental restoration is sound when scientifically executed, but it is neither scientific nor mechanical to depend upon the adhesion of cement to unassistedly retain inlays in position. Our first consideration, therefore, must be the formation of the cavity, but since this phase of the subject has been previously covered, I shall not take your time with an extended review. My best advice is, as it always has been, to depend upon mechanical retention through the agency of steps, dovetails and grooves, forming the cavity in such a way that occlusal or masticatory force tend to drive the inlay more firmly to place. Just here a word: It is neither imperative nor essential to cut away more sound tooth-structure for an inlay restoration than it is for a gold filling, provided both operations are properly done.

After properly shaping the box-like cavity—it is assumed that we are dealing with the molar and bicuspid region in discussing, generally, the gold inlay question—the wall margins which are subject to occlusal stress should be beveled in much the same manner as for a gold filling; the walls which are sheltered by the inlay and those not in line with occlusal force should be left square at the margins. This is important for two reasons: First, in finishing the wax pattern we have a square, sharp margin to which to finish, and in consequence can with certainty finish true and flush, and second, when the inlay is cast and tried in the tooth-cavity there are no feather-edges at the obscure margins to hide a gap and a consequent imperfect operation.

In the earlier days of casting I met with a number of failures by following

the advice of false prophets and leaving an overhanging margin on the wax pattern. The disagreeable part was that the "overhang" prevented not only seeing the defect in the pattern but the defect in the inlay as well, until after it was cemented in position and finished, when the cement line was plainly discernible, amounting at times to a glaring defect.

PATTERN.

It is imperative that the wax pattern be carved, contoured, finished, and polished just as though it were to be the permanent restoration. We have heard that anyone who could fill a tooth with wax and fuse gold could make a cast gold inlay. Experience leads me not only to brand this statement as ambiguous, but to emphatically state that making wax patterns requires as much skill, delicacy of manipulation and artistic ability as any operation which we are called upon to perform.

After experimenting with the great number of pattern waxes in the market, I have adopted Taggart's as the superior of them all, and use it exclusively for all inlays. It is a rather difficult wax to manipulate and on this account will probably be consigned by many to a remote corner, but when this wax is once mastered it comes within a few degrees of being ideal—would that we had a casting machine and an investment compound so nearly perfect!

The especial feature wherein Taggart wax excels is that at body temperature it breaks with a clean fracture, while the other waxes of which I have knowledge become more or less plastic at body temperature. While this plasticity is seemingly an aid in the manipulation, in that it admits the flowing of the pattern against a margin that was not brought into contact when the wax was molded in the tooth-cavity, the indubitable fact must not be overlooked that any wax which will at body temperature permit this spreading will at the same time be just as susceptible to distortion in an opposite direction. To test a pattern wax, hold a piece in the mouth until it as-

sumes body temperature, when, if it becomes plastic, susceptible to change on moderate pressure either by the teeth or fingers, it is not suitable for the purpose for which it was designed. There is a long train of maladies attending the use of a plastic wax that may be largely or entirely eliminated by the use of a non-plastic wax.

Assuming the cavity to be approximo-occlusal, involving all or part of one or more cusps, either of bicuspid or molars, the wax, which has previously been softened in water at 183° F., is quickly thrust into the cavity and molded quickly to place, and the patient directed to bring the teeth into normal occlusion, when with the fingers and proper instruments the buccal surplus is pressed into contact with the buccal wall of the cavity, the instrument being pressed into the interproximal space, thus forcing the wax into contact with the cervical margin of the cavity. As a generous surplus of wax has been used we have a rather uninviting appearing mass, which is soon reduced by rough carving to something like normality. In carving it is of the utmost importance that the pattern remain stationary in the cavity, *i.e.* without moving and rubbing against the cavity walls; the best way to prevent this is to carve the occlusal surface before disturbing the contact of the pattern with the adjacent tooth. The support given to the pattern by the adjacent tooth, together with properly directed force in carving, enables us to make the most extensive restoration with seldom an appreciable movement of the pattern. After the occlusal surface has been carved, our attention is directed to the lingual margins, then to the buccal margins, and lastly to the cervical margins, all these margins being finished flush with the square tooth-margins for reasons previously described.

We now have a pattern—not an impression—carved to form, except that it has a contact surface—not point—with the adjacent tooth, and is unpolished. The polishing should be done in the same order as the carving: First, the occlusal surface is gone over, touched where ne-

cessary with the carving instruments to bring out any artistic lines, and highly polished; then the lingual and buccal margins. Then with a pellet of cotton wet with cold water and held against the occlusal surface to prevent any movement of the pattern, a hot, very thin flat instrument is passed between the adjacent tooth and the pattern, and the abnormally large contact surface converted into a normal contact point, and polished with a wisp of cotton; the teeth having been previously separated, as they always should be, to admit of a subsequent normal contact being formed.

If all the steps have been followed with precision and a high regard for artistic attainment, we have a beautiful restoration of the lost part in wax.

To extricate the pattern an explorer is usually employed, though any of the well-known methods may be used, being especially careful to prevent the slightest marginal distortion. Here again it is of advantage to have square margins where sheltered, for it is manifestly easier to remove without distortion a pattern with square, well-defined margins than it is to remove one with feather-edges. The pattern is then attached to the sprue and examined under a magnifying glass to ascertain its perfectness, and if it is found to be flawless in its marginal impressions any carving which may be deemed essential may be done on the cavity side—and I might say right here that it is seldom that the cavity side of the pattern should not be carved, believing that by so doing we increase the efficacy of the finished product. This carving on the cavity side may be easily and expeditiously done with a light, sharp lancet or a bur in the engine, or a combination of both. The finishing touches being completed, the pattern is ready for investing.

INVESTING.

It is just as essential that the investing be properly done as any other part of the procedure. I have noted that some use scales, others measures to apportion the investment and water. I am not prepared to comment on this procedure, ex-

cept to say that at present I use neither. The investment should be mixed just as thickly as it can be and yet admit of the pattern being properly invested, and as it requires more time to coat a complex than it does a simple pattern, it is obvious that the investment should be mixed accordingly. Then, too, some are more dextrous than others, being capable of working with a much stiffer mix. Personal equation being such a potent factor in all our work, makes it next to impossible to formulate laws for operative procedures in the field of dentistry.

Ten to fifteen minutes after investing the pattern the investment is, or should be, sufficiently hard to admit of the sprue being removed, which should be done by heating the sprue to a full red heat for several minutes and twisting it out with pliers, thus preventing any distortion of the mold. Remember that we are dealing with the investment while in a semi-set condition, and great care is essential to success.

The flask is immediately placed over a very low flame, a flame of just sufficient heat to drive out the moisture without creating steam, and as soon as the investment is dry the flame is increased and the wax burned out. Formerly, the investment was allowed to dry overnight, but I believe this to be at variance with scientific findings relative to the setting of plaster of Paris, one of the ingredients in the investment. Be this as it may, I obtain better results by placing the "green" investment over a low flame ten to fifteen minutes after flasking—the castings are just as smooth, just as sharp, and without "feathers."

CASTING.

It is obviously impossible to go into extended detail of casting without considering the numerous devices that have been placed upon the market for the purpose, and this in itself would require a paper of considerable length. My advice, therefore, is after mastering cavity preparation and formation, to master the complete technique, and then it is time to master the device with which you expect

to do the casting. I fear that a great many have fallen and that more will fall by the wayside by beginning at the reverse end. That which goes to make up the entire casting problem is by no means easy of solution, nor suited to perfunctory methods or desultory application.

At present our work in this field is largely empirical; we have not practiced casting sufficiently long to have established it on a scientific basis, consequently we are too many times between the devil and the azure brine to know the how and the why. Some day the clouds will clear, and we shall broaden our horizon and place casting on a scientific basis. Then we shall have what we have not now, a perfect casting machine, a machine which will be automatic in its action, indicating the exact pressure on the gold in the mold and at the same time the temperature of the metal, just as our pyrometer furnaces indicate the temperature of the porcelain. This together with a perfect pattern wax and a perfect investment material will have a powerful influence in eliminating stumbling-blocks in the paths of those not especially adapted or reasonably versatile.

The two most important considerations with the present machines are to determine the requisite pressure and the proper state of fluidity of the gold. Too much pressure will expand and crack the investment, causing an imperfect casting, and if the gold is not sufficiently fluid a sharp casting is not to be anticipated.

No machine of which I have any knowledge will give an exact, sustained, determinable pressure on the gold in the mold, and with the machines of the "plunger" type it is risky, if you have a regard for veracity, to hazard a guess on the pressure. Therefore, no difference what device you use, experiment until you have mastered it, and by that time you will have discovered that the more fluid the gold is at the time when force is applied, the sharper the casting will be.

One way of determining the proper state of fluidity of the gold is this: First the gold assumes a globule, then the "bull's-eye" appears, and finally we get what may be termed the sun-glow. When

this stage is reached, if you are watching the gold very closely, you will notice a very slight spreading and flattening of the globule; this is the time to put on the pressure, and if it is done properly, and if 24-k. gold in very generous quantity—a quantity admitting at least 5 dwt. surplus—is the metal, you may be reasonably certain of success, though on rare occasions failure will stare you in the face. But, since it is in degree by our failures that we advance, they are not always to be despised but rather viewed as stimulants to subsequent success through fathoming the cause. "If at first you don't succeed," ascertain the cause, for the effect will follow in natural sequence.

INLAYS VS. FILLINGS AND CROWNS.

Why all this palaver about inlays and casting? Is it idle, flippant, deceitful talk? We have the good old tried-and-true gold fillings that have stood the test of time. We have amalgam, not so stable, but yet a wondrously good material. We have the gold shell and porcelain crowns. Why cram our psychological repertoires with knowledge pertaining to this newer, by some called faddish, thing, when we have for years restored teeth to usefulness by the old methods?

Yes, we have restored teeth to usefulness by the old methods, and I say frankly, emphatically, and peremptorily that the old methods are still extant, and will remain the friends and benefactors of our *clientèle* if they are confined to their proper fields of usefulness. This new thing is not antipodal to the old; it is not meant to ostracize or precipitately hurl into innocuous desuetude our good old pioneer friends. It is simply a kind brother who has arrived, and being a bit precocious and imperious, demands recognition and a place in the dental domicile.

Now, you good old dyed-in-the-wool gold-filling enthusiasts, what are you going to do with teeth similar to Fig. 1? No man can fill properly and with an assurance of subsequent success a tooth so

mutilated by caries. You will observe that but little is left except the enamel cortex, the dentin having been largely dissolved, a mere lining remaining. So you say, "Crown it." Previously to the inlay fad (?) I should have agreed with you perfectly, feeling that crowning was not only inevitable but that we were giving the patient the very best service possible. But today we should restore this tooth by utilizing the inlay method, and we should feel that better service had been rendered to the patient than could be done in any other way.

Let us outline briefly the technique for this case (Fig. 1), and then decide whether or not I am correct in my diagnosis and prognosis. We carefully fill the cavity with cement, building from the floor of the pulp-chamber to the inside edges of the walls of the cavity—the cavity side of the inlay gives an idea of the cement filling; a pattern, perfect in respect to occlusion, a feature not to be lost sight of in this work, is obtained, a sprue of the desired diameter is attached to the cavity side of the pattern, and the inlay is cast. After having been removed from the flask, cleaned in hydrofluoric acid and washed, the gold, which was formerly represented by the sprue wire, is sawed off to the desired length and we have an inlay with a post, all cast in one piece. This way of forming posts is mentioned as being unique and convenient, and the writer has not seen any previous report of this method. Many variations will suggest themselves to the ingenious mind, as using two sprues in different locations or side by side, either parallel or with the outer ends divergent, etc. With a bur the cement in the tooth is cut away freely to admit the post, the inlay is cemented to position, the edges are burnished to the enamel margins and polished. The inlay being perfect in adaptation to the tooth-walls and to the cement filling, and a post extending into the cement, equalizes the forces to which the inlay is naturally subjected in such way that fracture or displacement, in the opinion of your essayist, is not to be anticipated. (One wall of the tooth has been ground away in order that the rela-

tion of the post to the tooth may the better be observed.)

(24-karat) melted in the crucible in the flask, and the tin ointment-box with its

FIG. 1.

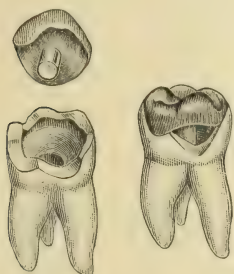


FIG. 2.

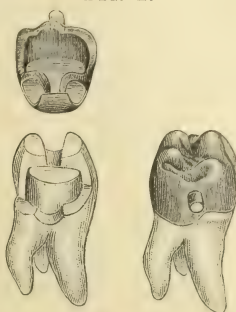


Fig. 2 is a case of the same general type as that shown in Fig. 1, *i.e.* where

lute of clay brought down on the flask. You will note that this is as perfect a

FIG. 3.

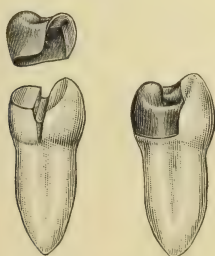
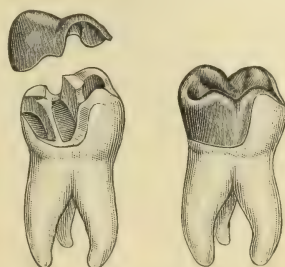


FIG. 4.



crowning would have formerly been justifiable.

Fig. 3 illustrates a hood attachment

casting as can possibly be made by any machine—but don't permit this to lead you astray, for while it is but one of a

FIG. 5.

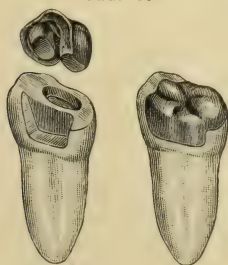
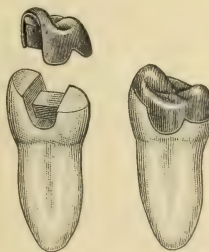


FIG. 6.



which was cast by means of a tin ointment-box nailed to the end of a stick. The box was filled with moist clay, a depression was made in the clay, the gold

number made in the same way, it does not represent the many many failures that were made. Perfect castings can be made with the crudest devices, but ex-

perience will prove that the cruder the device the higher the percentage of failures.

In speaking of clay as a lute, if those who use "plunger" machines will use a good quality of blue or yellow clay, free from loam, in the same way that moistened asbestos or moldine is used, they will find the clay, moistened with water, to be a far superior article.

The cases shown in Figs. 4, 5, and 6 could, with laborious work on the part of the operator and at the expense of great nervous strain and fatigue to the patient, be filled, but can they be restored to the same degree of usefulness as they could by the casting process? From an orthodontic standpoint—a phase of our work that is receiving too little attention—the casting process is far and away ahead of all other methods in restoring these extensive cases, and if we are to be guided by experience, the writer is disposed to place the inlay process in the category of permanent restorations—permanent in our general acceptance of the word as applied to dental restorations by artificial mechanical means.

It would be inconsistent and unreasonable to expect permanent success in each and every case of extensive inlay restoration, since much depends on the general environment, the habits of the patient, unforeseen accidents, and the ability and inclination of the patient to appreciate the effort that is being made to prolong the usefulness and comfort of a very important organ.

Eliminating special cases, where are inlays indicated? Generally speaking, the writer would say, where fillings and crowns are contraindicated, and he who can with palpable proficiency always and under all conditions draw the line is indeed a *rara avis*.

CROWNS.

In crown work, both gold and porcelain, the casting process is indispensable if a high regard for adaptation of the crown to the root, occlusion, contour, and preventive measures be pertinent to our practice.

During February 1907 your essayist restored to usefulness two roots—one a right central, the other a right first bicuspid, both upper—that formerly would have been extracted, and with conservative justifiableness. Since a very able article on the technique of this operation, from the pen of Dr. Lane, may be found in the DENTAL COSMOS, 1908, p. 37, further comments are unnecessary, except, perhaps, that I might say that in badly broken-down cases the cone in the root should be packed with temporary stopping to force the overlapping gum tissue from the ragged root margins, the margins should be as perfectly true as possible, and the operator should proceed à la Lane, using an S. S. W. detached-post crown, as they may be had with a platinum post.

If a crown with a replaceable facing is desired, prepare the root as in Fig. 7, or as nearly that shape as the root will permit, not scaling the enamel as for a collar crown; grind the facing and backing to approximately fit, allowing space for a film of wax between the facing and the root end, insert an iridio-platinum post in the canal, adjust the facing and backing, and attach the post to the backing with sticky-wax, remove, slip the facing off, invest and "tack" the post to the backing with 20-k. solder; replace the facing, flow hot pattern wax over the lingual surface of the backing and the previously oiled cervical end of the facing and force gently but firmly to place, the occlusion being noted and all surplus carved away. On removal it will be found that we have a perfect impression in the wax pattern of the root end on the one side, and removal of the facing discloses the same to be true of the cervical end of the facing on the other side.

With the facing in position, any additional carving for artistic effect may be done outside of the mouth. All being completed, it may be tried in for final confirmation, removed, the facing slipped off, the sprue attached, invested, and cast. The casting is represented in Fig. 8, the finished product in Fig. 9, and a lingual view is given in Fig. 10. Kindly note

the adaptation to the root and the natural appearance of the lingual aspect.

For anterior crowns with collar, either fixed or replaceable facings, there is nothing to be gained in casting except a more natural and artistic lingual aspect.

Regarding casting directly on porcelain there seems to be a diversity of opinion,

In gold crown work the special features wherein the casting process reigns supreme are occlusion, contour and approximal contact, three most important considerations in this work, and we know of no other method so ideally adapted and so easy of execution. Briefly the technique is as follows: A band, Fig. 12,

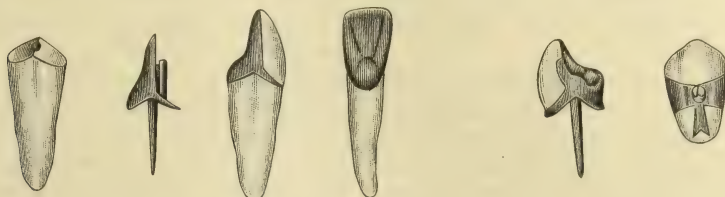
FIG. 7.

FIG. 8.

FIG. 9.

FIG. 10.

FIG. 11.



some claiming it to be practical, others not. Personally, I see but a narrow field for this procedure, but can see no more reason for checking the porcelain in casting, provided the investment be kept sufficiently hot, than by the soldering process. The two specimens represented in Fig. 11 are free from *apparent* checks (see COSMOS 1908, p. 197, "The Soldered

as for an ordinary two-piece crown, is fitted to the previously prepared root—it might be added that a root cannot properly be prepared for banding unless it is denuded of its enamel—the band is cut to proper length, conformed to approximate shape, removed, and dried. Cotton rolls or napkins are placed in the mouth to protect the band from saliva,

FIG. 12.

FIG. 13.

FIG. 14.

FIG. 15.



Porcelain Facing 'Checked'—Causes and Remedies," by Clarence J. Grieves). The crown was put through the casting process three times for experimental purposes; the other specimen is an S. S. W. plain tooth which was ground out, the cavity being undercut as for a gold filling and the gold cast directly into the cavity. This procedure has no practical value in our work, being done for experimental purposes only. Except polishing, not burnishing, this piece is just as it came from the flask—kindly note the adaptation.

the root being left moist but without any excess of saliva, the band is placed in position, a ball of pattern wax softened in the flame and pressed into position on the band, and the patient instructed to close the teeth together. As a surplus of wax has been used we have as in inlay work an uninviting appearing mass, which is soon reduced by very rough carving, the patient being instructed to masticate, and after ascertaining that all is right the band with wax intact is withdrawn by a hooked instrument passed under the free margin of the gum and

engaged with the edge of the band—to remove the band and wax with the fingers usually spells failure.

The band and wax are then dried with blasts of cold air, additional wax is flowed around the outer portion to the required contour, cusps are carved, the surplus wax is removed from the interior with a large spoon excavator, and all is finally polished, the sprue attached, invested and cast, coin or 22-k. gold in very generous proportions being the metal used.

Cast crowns have a distinctive individuality, and a naturalness in occlusion and contour that is beautiful to behold. Specimens Figs. 13, 14 and 15 are fair examples of what may be accomplished, Figs. 14 and 15 are cusps carved from nature, Fig. 15 especially illustrates the superiority of casting over swaging.

BRIDGE WORK.

In bridge work, both fixed and removable, the casting process is very useful, but, as in the other fields, should not be carried to extremes. Extensive bridges cast in one piece, three or four teeth supported by inlays at either end as a permanent fixture, and like procedures are usually contraindicated and will tend to bring the process into disrepute. Yet when the process is used with skill tempered with judgment, much benefit will accrue to the conservative operators and to their *clientèle*.

Casting is so new, it covers such a large field, and we have so much to learn about it, so much to systematize and standardize, that it will require a long time and the concerted efforts of our foremost scientific minds and inventive geniuses to give us superlative excellence in apparatus and materials, to improve the methods, and simplify the technique. In the meantime it behooves each and every one of us to lend any assistance of which we are capable by encouraging those who are working for the unselfish interests of mankind, for the casting process is a very valuable addition to the dental arma-

mentarium, not so much from the standpoint of the dentist as from that of the public. Formerly we could and did conserve the human teeth, but with the casting process as an additional adjunct much better service can in many instances be rendered. Since employing the casting process the writer has "inlaid" a number of teeth that formerly would have been crowned. One case in particular is standing out in bold relief: About two years ago an upper first bicuspid was treated and the canal filled preparatory to crowning, and as the patient requested that crowning be deferred for a time, the tooth was restored as well as was possible with cement. The buccal wall and a little less than one-half of the lingual wall was standing; mesially and distally caries had progressed to the gum line. When the patient presented the second time, as she supposed for a porcelain crown, the cement was removed as required, the wall margins trued, a pattern made and a gold inlay was cast and cemented in position. This inlay restores the entire occlusal surface, both approximal surfaces, more than one-half of the lingual wall, and shows to about the extent of a millimeter along the buccal cusp. Now I ask, seriously, Has this patient received better service than would have been rendered two years ago? I have restored a number of similar teeth, teeth that would formerly have been crowned, and I feel that the patients are receiving the benefits of a decidedly better service, for to my mind crowning should be considered as the very last resort!

While this paper is of necessity but a summary, I trust that it will be instrumental in bringing out further contributions to the subject embracing many salient points and original thoughts respecting this important phase of dental restoration by artificial mechanical means, for notwithstanding the advances already made in preventive dentistry, there seems yet to be need for this barbarous practice.

PREVENTIVE DENTISTRY—PROPHYLAXIS.

By ALICE G. HARVIE DUDEN, D.D.S., Indianapolis, Ind.

(Read before the Alumni Association, Louisville, Ky., Dental College, April 1908.)

I HAVE very recently asked several dental practitioners in good standing what their general definition was of the word Dentistry, *i.e.* what to their mind did the word stand for, or what did it convey.

The first man who was asked very promptly replied: "Dentistry deals principally with filling teeth, of course."

The second man gave a more detailed and comprehensive reply. He said that dentistry, to his mind, conveyed the idea of operative work, including the filling of teeth, supplying crowns and bridges, making plates, extracting teeth, and relieving pain.

The third man, after some deliberation, replied that, exclusive of orthodontia, dentistry is principally restoration; it is an operative procedure to the end of supplying that which was lost.

"That which was lost." The writer asked if this were all that he labored for so diligently and faithfully every day—if these were his ideals (for we must all have ideals, be they high or low)—if this were all he had been fitted for and so carefully trained in, during the years he had spent in the dental college and out of it? He said he believed it was; and he is a conscientious man of much ability.

Others were asked, and the replies were all more or less similar. It would seem, then, that the consensus of opinion is—or has been in the past—that the sum and substance of our efforts deals with the making of the best piece of artifice which we are capable of producing, to supply "that which was lost."

Truly, what a lot of refined mechanics

we have been! The jeweler might well envy some of us.

What a world of regret takes possession of us on getting away from the carpenter's or mechanic's view of dentistry, when we take time to consider what false ideals we have set up for ourselves—which false ideals have seemed fairly good and substantial to us! It is marvelous how zealously we have followed these false standards; our zeal has been well-nigh frenzied at times. We could make a more beautiful substitute for real tooth-structure than anybody else and shape it so cunningly that it could hardly be detected; we were craftsmen indeed!

Had such zeal, such commendable ardor, been directed along correct and altruistic lines, what sincere cause for gratification we could cherish!

PROPHYLAXIS THE TRUE IDEAL.

Allow me to present to you a picture of true ideals—of operative work in the mouth, of another character—of a manipulative effort which is fraught with nothing but blessings and confers the stamp of true professionalism upon us, in the practice, *viz.* of *preventing disease*. I speak of oral prophylaxis, the significance of which is now, I think, well understood. The word itself is derived from the Greek *φύλασσω*, *phylasso*, to guard, and *prophylasso*, to keep guard before, was employed by the Greeks relative to the duty of the soldiers keeping guard over the entrances to the city—the outposts or sentinels. In connection with dentistry the word may be

defined as preservative or preventive treatment, and must not be confused with "prophylactic," which, as a noun, means anything used as a medicine which defends against disease.

Prophylaxis is an art, or surgical treatment, involving manipulative effort as distinguished from the administration of a systemic or therapeutic remedy. At the present time this treatment is engaging the attention of those earnest and thoughtful men in the profession whom we look upon as leaders and teachers, and we all acknowledge that by this process we have for the first time triumphed over caries.

There are three great specialties in dentistry at the present time. These are orthodontia, inlay work, and prophylaxis, and it is conceded that the most important and by far the most beneficent in its effects is that of prophylaxis.

But let us return to our picture of true ideals. I am first going to place before you a most significant truth that has been confronting us, ignore it as we would.

Self-cleansing surfaces of human teeth *never* decay, are never attacked by caries. How strangely slow we have been to learn our lesson from this evidence—if we have even taken cognizance of this fact! The rational deduction would be that if all surfaces could present such ideal conditions, absolute immunity from caries would be established.

To one hearing this for the first time such a statement must sound startling, yet those of us who have been pursuing oral prophylaxis (preventive dentistry) for several years know whereof we speak. We have treated and watched our patients' mouths with a jealous eye, we have promised them freedom from the heavy yoke of caries, pyorrhea, gingivitis, foul breath, and we have incidentally eradicated many systemic troubles. Our promises have been fulfilled, and as a result there comes to the operator a sense of satisfaction and gratification never experienced by the practitioner who has not pursued oral prophylaxis. A sense of having accomplished our highest mission

as dentists, of ideals attained and maintained, brings its own reward.

To do less than offer our patients prophylaxis is to fall far short of our duty; for if we know how to prevent caries, and at the same time bring about a beautiful condition of the mouth such as only prophylaxis confers, and yet do not offer this panacea to our patients, are we not wilfully and culpably negligent? Instead, we do mechanical work, and continue doing so, because perchance we *like* that better, which is surely no adequate excuse! We fall miserably short of our duty and are not worthy of being ranked among the professions, for such ranking depends entirely on the advance of prophylaxis. Our standing with our brothers in medicine will be proportionate as we bring about prevention of disease. In New York city nowadays a man goes to his medical adviser simply to be kept well; he reports every two months, when heart, lungs, the fluids of the body, and other data are most thoroughly examined and watched, and the first false note is rigidly attuned.

We have upon us the greatest forward movement in the history of dentistry; this movement has taken long to come, and it has been grasped slowly by the profession; but because of these facts we have all the greater assurance that we possess a certainty. For, one fact I wish you to mark, that once a practitioner puts into practice oral prophylaxis he never retreats, he never relinquishes it; he cannot do so, his conscience will not let him do so—nor, incidentally, will his patients.

TECHNIQUE AND RESULTS IN PROPHYLAXIS.

Thus far this paper has dealt with the general aim and scope of the work; the second part will treat of the technique involved and the results obtained. But first I wish to refer briefly to the causative factors which interested me in oral prophylaxis. It is needless for me to tell you that Dr. D. D. Smith is the author and father of our present systema-

tized prophylactic treatment. Shortly after my introduction to this revolutionized dentistry, I had the privilege of paying a visit to Dr. Smith's office in Philadelphia, where I spent two memorable days along with five other practitioners. During that time we saw upward of forty of the most beautiful mouths we had ever looked upon—dreams of loveliness at which we simply marveled. First, there were the children, who presented oral conditions which were a joy to behold. These children had never known the ills of caries or toothache, their teeth glistened, their gums were of a lovely pink hue, the whole mouth was radiant. Then there were the older people, who unfortunately had not experienced the benefits of prophylaxis sufficiently early to enjoy prevention in its fullest degree. After the patching, however, they were placed on the prophylaxis list, and there was no more patching to do—they as well as the children exhibited a beauty of mouth that is difficult to imagine without having seen it with one's own eyes. As with the children, the teeth had taken on that translucent appearance which prophylaxis confers; the gums presented perfect festoons, which would have delighted the eye of any critic; they were hard and dense, and proof against bleeding even from the harshest treatment.

We were profoundly impressed by all that we had seen; we had looked in upon a new world in dentistry, one of boundless possibilities. We came away firm in the resolution that henceforth our work should be that of conserving tooth health.

I commenced by setting aside one day of each week to be devoted exclusively to oral prophylaxis. Within a very short period, a month or two at most, I had to devote two days; in six months' time three whole days were required, and so I have had to keep on adding day after day, until practically my whole time is taken up by this work. The demand was great and insistent. I found that it appealed to the thinking people of the community at once; to be sure, I had to do something in an educative way just at first, but not very much. My patients grasped the meaning of my efforts more

quickly than I had dared to hope, and their general attitude was expressed in the words of one gentleman, who said tersely and to the point, "It needs no further argument; why didn't we have it sooner?" And it was not long before prophylaxis began to proclaim its own virtues. It was a common happening, too, to have people come to me and offer themselves as patients with some such remark as—"What have you been doing to our Mary's mouth? her teeth are lovely; can you improve the appearance of mine as much as you have improved hers?" These latter patients belonged to that class whose sense of pride had been appealed to.

I have spoken of the results which Dr. Smith obtained. I have the same results in my own practice, and anyone may duplicate them. Truly, a prophylaxis mouth is a joy to behold! Receding gums are creeping back to place, they become hard, dense, and fibrous, and refuse to bleed even after the harshest treatment, while, as I mentioned before, the enamel takes on a wonderful luster and translucency, so that instead of looking at the tooth, one looks into it, as it were, all opacity having disappeared.

So far I have spoken only of the local or mouth benefits derived. There are other and farther-reaching benefits than these; if you could but know how many cases of indigestion and chronic sore-throat troubles you can eliminate by putting into practice oral prophylaxis, you would be astonished.

On the occasion of our visit to Philadelphia to Dr. Smith, the patients themselves attested to the improvement in their general health. They were a grateful people. Even their complexion was markedly clear; Dr. Smith called our attention to this feature. The mouth is truly the vestibule of life; the air we inhale, water and food, *i.e.* all that supports life, must pass through the mouth. Now, if these necessary elements are tainted by foul matter as they pass through this vestibule on their way to the general circulation, do you wonder that toxins are absorbed, with lamentable sequelæ?—which are increased a hun-

dredfold when the pus is swallowed, as in pyorrhæal conditions. And we go farther than this; we believe that could all children receive systematic prophylaxis, diphtheria would be well-nigh stamped out, for the average mouth, reeking with infection, offers an ideal medium for the incubation period of the bacillus diphtheriæ. Tuberculosis would claim fewer victims. Space forbids, else I might continue citing pathological conditions which inevitably yield to the routing of auto-infection.

Let me emphasize just one more instance of the far-reaching effects of oral prophylaxis in connection with systemic pathological conditions. I wish that some physicians or general surgeons might be present, for I wish to set them thinking. I should like to put some such question to them as this: How often do you carefully examine the mouth conditions of a patient who is about to undergo an operation for appendicitis? I have asked many physicians if they make a practice of doing this, and have invariably received a negative reply, or a reply to the effect that they never had; it had not occurred to them. Such ignorance or carelessness needs no comment, for after the operation there is an open wound situated in the alimentary tract. The mouth is a part of the alimentary tract from which infectious material is constantly passing the seat of the open wound; this is still worse if pyorrhea should be present. Can you imagine anything worse in the way of auto-infection? Surely this is an instance where the medical profession might learn something from us, and by putting such prevention into practice we undoubtedly place ourselves on the same level as our brothers in medicine. Do you wonder that the patient's temperature goes up so frequently on the evening after the operation?—yet the nurses and doctors are at a loss to understand the cause. I have not the least doubt that many lives have been sacrificed owing to this negligence, for even from the average mouth, with no pyorrhea present, infection of all kinds is constantly being passed into the system—

bacteria both pathogenic and non-pathogenic. I have lately done some microscopic work along these lines, and have been astounded at what was revealed to me from a normal mouth with no pyorrhæal condition present.

Yet in spite of the foregoing facts in connection with prevention both in the mouth and in the system, I have heard dentists say, "Oh, I do not believe in prophylaxis."

The general apathy toward prophylaxis among the profession in the past has been deplorable. Today, however, one can hardly find a dental journal that does not contain one or more articles on oral prophylaxis, which is a sign of dawn. Another markedly hopeful sign is that oral prophylaxis is now being taught to the students of two dental colleges at least.

Before leaving the arguments for or against prophylaxis, I should like to discuss one more point with you, one which I have heard made frequently and which to many seems a stumblingblock until they put it into practice, which they seem fearful of doing. The following generalizes the sentiment as expressed by many: "Oh, well, if you can get your patients to come once a month for treatment, that's all right; I know that I couldn't." No, such a man probably could not, for he has in his mind the fixed idea that his patients will not come, even when he asks them to; and naturally the patient responds to his fixed idea. My answer to those men is to give their patients the benefit of a few treatments without insisting too much at the beginning that they should pay a visit about once a month, and to see later if they are willing to go back to old methods. I think they will not be—in fact, I know from much experience that they will not.

This matter of the patients coming for systematic treatments lies entirely with ourselves. If you go about it in an earnest way, if you are enthusiastic, the love for your work cannot be mistaken; patients catch your enthusiasm and enter into it with eagerness, and thereby really do a full half toward the radical change that takes place in their mouths.

I excite their interest; I make the first prophylaxis sitting a most instructive one, and the patients follow my instructions with the deepest interest. I do not hide the fact from the patient that he is to contribute just about one-half of the work and I the other half, but I make it most emphatically understood that he cannot do without my half any more than I can do without his. The monthly care, oversight, and supervision is absolutely necessary, as is the daily care. I demand a good deal from the patient, and I invariably get it. The dentist has to assume the position of an autocrat in this relation, making it fully understood that he absolves himself from all promises if he does not have all the aid which lies in the patients' power to give by their constant personal care. Such co-operation is a force to which all foes lurking in the human mouth must yield.

At that first treatment, too, the patient is taught the new name for this wonderful new work; the meaning of the word is made clear, the dignity and prestige attached to the name, and the work is fully explained. The patients learn not to call it "cleaning teeth," for cleaning teeth as it is generally understood is a delusion and a snare, and reminds one very forcibly of a dirty schoolboy, who washes his face just as far back as the ears, leaving a dirty tide-mark beyond. The ordinary cleaning of teeth by dentists, as it has been practiced in the past, consists of spending about fifteen or twenty minutes with a little brush or rubber cup revolving on the engine and perchance a little rough scaling of the lingual surfaces of the lower incisors. What about the distal surfaces of the posterior teeth, the interproximal spaces, which are filled to overflowing with infectious matter; what about the distal surfaces of the molars to which some beautiful piece of bridge work is attached, the root becoming exposed and infection lying festering there for months, aye, for years perhaps, until the beautiful piece of bridge work is ready to fall out owing to the loosening of the anchor teeth? Such teeth cannot receive

enough care; weekly treatment would not be too often, if you would retain your mechanical work.

Such an expression as "cleaning teeth" conveys to the patient something so radically different from prophylaxis treatment that the work *must* have another name. The first prophylaxis treatment is a revelation to a patient. When the question of fees comes up, naturally a patient expects to pay just as much for this class of work as for operative work of another kind, for it is infinitely more valuable to him, and one is rendering the patient an infinitely greater service by giving him prophylaxis treatment, *i.e.* conserving and preserving the integrity of his teeth forever, instead of offering the miserable substitute of a patch, which is only a crutch to get along with for a longer or shorter time, according to whether the operation is well or poorly executed.

You must not cheapen this work; it must be charged for by *time*, at the same rate as your other services; you belittle it by doing otherwise and do an injustice to yourself at the same time. There is also the tendency to slight the work—its necessary thoroughness may be lost sight of, which is fatal to prophylaxis!

Let us now consider the technique involved. The patients present themselves for treatment once a month for ten months of the year, for a patient undergoing these ten consecutive treatments can, as a rule, very well hold his own for the two summer months without attention. In many cases, however, I have the patient come at first at shorter intervals than a month; in pyorrhea cases once in three days, for a while. In explaining to your patients the necessity of this monthly treatment, I would say, go back to the definition of the word "prophylaxis"—*i.e.* watching, maintaining, guarding—for neither one nor two treatments can be called prophylaxis. If these systematic treatments are not rigidly held to, and if the time between treatments is stretched out, it is more than probable that decalcification begins at some point where particles of food

and deposits have been lodged for some time, with the usual sequela, lactic acid fermentation.

The technique consists of thorough removal of all calcic deposits, solid and semi-solid, secretions and excretions, mucous and bacterial plaques, and of disposing entirely of that gelatinous envelope which so completely invests every tooth, even in the best-kept mouths. This gelatinous envelope consists of a very tough and slimy material which when touched with the wooden points causes them to slip and slide over the surface of the tooth, and the removal of which gives the operator a sense of having a grip on the tooth-surface.

The removal of deposits is effected principally by instruments of the nature of a file. I use a part of Dr. Smith's set of files designed for this purpose, and also four of the Rutherford set, which is splendidly adapted to fit in with the Smith instruments and appeals to every operator who has given thought and time to the technique.

In the instrumentation of cases in which one finds an extremely sensitive condition of the gums at the first operation, I recommend the packing of bicarbonate of soda freely around the sensitive parts; then proceed to the other less sensitive teeth and later return to the sensitive ones, when you will find that you can work with little or no pain to the patient.

During the operation I continuously sterilize the instruments; after the operation the thorough sterilization of the instruments used cannot be too strongly emphasized—for in the first three or four treatments the soft tissues are dealt with to a large extent, and there is much danger from infection unless due precaution is taken. Thoroughly boil every instrument used, for it is much easier to go to the slight trouble of boiling than to have to deal with a case of infection afterward.

Next, orange-wood points are used, carried in the porte-polisher. I use the Harrell porte-polisher, which is the best thing of its kind I have ever seen, with its curved handle and contra-angle

possibility. I now use shoe-pegs instead of orange-wood; these pegs must be first boiled, as they are extremely septic when obtained from the shoe-dealer. These are better than orange-wood for the reason that they conform to the irregularities of the tooth-surfaces, convexities, concavities, etc., infinitely better than the orange-wood, which stands off square and hard even after the wedge form is given to it. Shoe-pegs act more in the manner of a coarse sponge. The wood is charged with a fine preparation of silica or pumice, which is the actual detergent. There has been recently put upon the market by the Buffalo Dental Mfg. Co. a very fine preparation known as flour of pumice, a much finer and more elegant powder than ordinary pumice. For the first few treatments ordinary pumice is used, but afterward the finer material is more desirable and produces a beautiful luster. Tin oxid for a final polish imparts a very brilliant appearance to the teeth.

Every exposed surface of each tooth as well as the surface under the free margin of the gums (where so much infection lies) is polished, and eventually a glistening surface presents itself.

There is a right and a wrong way of polishing—what might be commonly called working with or against the grain. The motion must follow the axis of the tooth—that is, in the direction of the enamel rods.

Only hand power is resorted to; the use of the engine in any part of the process would entirely defeat the object of this method, for it is by a cultivated sense of touch that we discern the conditions. The tactile sense in time becomes very keen, nothing can escape it. It is not so much a matter of seeing as of feeling.

The work has to be exquisitely thorough; your *success* will be proportionate to your *thoroughness*, and it must be borne in mind while giving a prophylaxis treatment that each tooth has five surfaces, each of which must have its full share of care; indeed, as I once heard a practitioner say in speaking of this phase of the work, "Each tooth should be

treated as if it were the only one present in the mouth."

Waxed floss silk is then drawn through the interproximal spaces, whereby the operator has the opportunity of giving his patient some instruction as to the correct method of its use—for not one patient in a hundred knows how to use the silk—nor would it seem that many practitioners know how to use it—for floss silk wrongly used can do more harm than good. The idea to be borne in mind is that the septum of the gum between the teeth is to be preserved, and the tooth surfaces scoured, for in each interproximal space there are two surfaces to be cleansed. It will not suffice to merely pull the silk into the space and then release it. Finally, I apply compressed air, using as high a pressure as fifty pounds or more, carrying a soothing or stimulating medicine or an astringent, as the case demands—at any rate, something of an antiseptic nature—deeply into the pockets and the free margins of the gums. This last process is always a source of pleasure to the patient. I have yet to meet one who does not hail the spraying with a keen sense of enjoyment.

The effect of this forceful spraying is that of massage under the free margin of the gums, which reaches parts that are almost inaccessible to any instrument. By this method pyorrhea pockets are flushed and cleansed as nothing else can cleanse them. Débris, loose deposits, and pumice are most effectually and instantly removed.

I use for this purpose a special set of atomizers made of glass, hard rubber, and nickel, and quite inexpensive. Indeed the whole compressed-air outfit can be installed at a moderate cost. The solutions used for spraying must be hot, at least 150° F. The higher the pressure the hotter must be the solution. Atomizing under such high pressure reduces the temperature instantly.

As to the solutions used in a case of pyorrhea, hydrogen dioxid should be first employed; indeed, frequently before touching a pyorrhea mouth I spray it with the dioxid, which entirely clears the pus from the field of operation and ren-

ders such work infinitely more pleasant. For ordinary prophylaxis a weak solution of phénol-sodique should be used, followed by an attenuated solution of glycothymoline or any one of the excellent standard preparations on the market.

Following all of this, you can well imagine that nothing that is not aseptic is left in the mouth. The patient leaves the chair with a sense of oral cleanliness such as he has never known previously to a prophylaxis treatment.

Just preceding the patient's leaving the chair, however, I make one last manipulative effort, which consists of a few minutes' massage in the first two or three treatments; this is not needed later, for the patient has learned how to take care himself of that part of the operation. As a result of the first treatment the gums are somewhat bruised and tender, and correct manipulation is most grateful to these parts and soothes the patient wonderfully. I literally pull the gums back into place, when I have pushed them aside in order to remove deposits.

This is at the same time an instructive lesson to the patients, for I require the same massage on their part, also the rotary movement. Wright of Cincinnati says, "I know of no better 'preventive' measure than properly applied massage or stimulation of the gums, under a trained hand."

INSTRUCTION TO PATIENTS.

Now I must speak about the instructions to be given to patients. At the beginning I have a thorough understanding with them, telling them of the full value which they will receive for the money and time spent, but adding that I absolve myself from all promises if I do not receive all the aid which it is in their power to give me by their constant personal care, by the daily massage of the gums by both brush and finger. What is known as the rolling movement of the brush is the most desirable. Silk floss and proper tooth-picks are very essential; wooden tooth-picks must not be used; they *must* be of the quill variety, as the gum septum is

too easily injured and the gum festoon destroyed which we are trying so hard to preserve or to restore. With wooden picks decomposing food is often pushed under the gum surface, and an irritation due to septic matter results.

A first-class dentifrice must not be neglected by the patient. I advocate brushing the gums instead of the teeth, thereby obtaining infinitely better results. I say to my patients: "You need not fear; your teeth will not be neglected." The object is to have the free margins of the gums, where so much infection lies, kept thoroughly clean. The average patient hardly comprehends that requirement, as he has in his mind the idea of simply brushing the teeth.

At a subsequent sitting I make a very careful investigation of the patient's mouth in order to discover if there are any soft or bleeding gums. I usually find one or two such spots, which indicate conclusively that little or no friction or brushing has been applied to those parts; the patient has unconsciously missed them and is grateful to have these spots pointed out, and will see to it that in future no part is missed.

I do not find it necessary after about half a dozen treatments, if the work has been thoroughly done, to continue to use the steel instruments. All that is necessary are the wooden points, polishing, spraying, etc.

I must not forget to mention silver

nitrate, which I use in conjunction with prophylaxis and which is itself a prophylactic. I apply a saturated solution to the grinding surfaces of the molars of children's and adults' teeth, using it even when there is no apparent decay. I also apply a 10 per cent. solution around the necks of sensitive teeth and about the gums, with splendid results. By way of caution it must be observed that no porcelain inlays are in the vicinity, for the margins might be outlined by a little discoloration even after the application of a 10 per cent. solution. Such fillings and margins must be varnished very completely, after which the silver nitrate can be safely applied.

In concluding, may I express the hope that you one and all will put into practice this work of conserving the teeth?—for, in view of its results, 'tis surely the noblest activity in which dentistry can find expression. It is not easy work; instead, it is very exacting, demanding much time, skill, and thoroughness—which last I would emphasize once more, for lack of thoroughness will but bring ignominy both upon oneself and upon the work of prophylaxis. The skill demanded in scaling comes only after long, persistent experience, by which the tactile sense is cultivated to a very keen degree. It is an easy matter to do more harm than good in this phase, should the periodontal membrane be injured in unskilful attempts.

PITFALLS IN DAILY DENTAL PRACTICE.

By FRANK W. SAGE, D.D.S., Cincinnati, Ohio.

(II.)

WE have seen in discussing this subject (see February issue of the *Cosmos*, page 204) that the dentist may easily make himself the most imposed-on man in a community. Not necessarily by his enemies; his friends

often help. Dentists are not alone in this. The druggist, whose place is headquarters for all the town loafers, is a familiar example of good-nature suffering at the hands of the too friendly.

It must seem constantly thrust upon

the reader's attention, as it is upon the writer's, that all depends upon the man. If it were not that men, and women too, often improve as they advance in life, overcoming early weaknesses, there would be no hope for many. My object in writing is to forewarn.

Patients often require time to think over a bill before becoming reconciled to the dentist's charges. Yet many a dentist, seeing the look of consternation in his patient's face when the latter learns what he is expected to pay for the finally finished service, invites by his own actions a request for a reduction. A patient all but has a spasm upon discovering that he is expected to pay fifty dollars, a hundred and fifty, or more. You need to treat that patient as the surgeon does his patient—let him go home, lie down, and get over the shock. Don't knock off five dollars or five cents.

A dental bill is not an everyday occurrence; do not forget that. Your bill may mean for the patient no National-Park trip next summer. What is that to you? Don't falter and back away, even in spirit, because he or she looks stunned; be firm, yet pleasant about it. Think a little more about yourself and your family, and leave it to the patient to contrive how to meet this unusual expense. That is not your affair; you have your own unusual expenses to meet. How many reductions do you find you can get?

Part of the business of the dentist, a part only too often sadly neglected, is to reconcile his patient in advance to a large bill. Make the suggestion that it will cost about so much. If the patient demurs and backs out, all that has been demonstrated is that he is not your patient. Whether he be rich or poor, if he cannot or will not pay, he is no patient for you. The dentist is wisest who earliest finds out whom he has to depend upon in a community. A community of wealthy niggards may mean less to him than another of less means and more appreciation.

Many dentists lack the diplomatic art of the most successful in the profession in talking over in advance what dental operations are to be performed, the prob-

able cost, and the terms of payment. Learn to do that. Do not seat a patient and begin operating, as if the only important thing to you was to show how absorbed you are in the mere mechanics of your profession. Such a course is well calculated to impress patients with a belief that all that dentists want is to get to work, at almost any fee. Keep him awhile in the waiting-room, talking over what you propose to do. There is often money in simply waiting. In this way it is soon spread about throughout the community that you expect pay, and the dead-beats will let you alone. Then you can soon find out whether you care to stay in that town or not.

There are numerous little pitfalls in which a dentist may dislocate a leg, if not break his neck. You decide, for instance, that you have charged rather too much for a plate. The patient's manner perhaps indicates a feeling that the price you named is a great deal for that little plate. You feel in justice to yourself that you can reduce the charge. Do so, by all means; but do not say, "Now, I find I have had less trouble with the plate than I expected; it has cost me somewhat less, so I will fill this tooth for you without charge, to make up."

The better way is to frankly name a lower figure for the plate, and then name a definite price for the filling; otherwise the patient may feel privately dissatisfied. Definite figures should be named; then your patient knows exactly what you have done. It has the same satisfying effect that a purchaser feels when paying forty-nine cents instead of fifty for a pair of gloves.

These are some of the little inscrutable mysteries of human nature which it pays to heed.

Singular as it may seem, many a dentist gets into trouble through being over-conscientious. He attempts to patch the other dentist's filling, which seems too good to remove bodily, and in the end has to do over his own part and that of the other dentist too. Take no risks; remove the entire filling if there be any remote chance against your success in trying to compromise. Repair the pa-

tient's plate, not merely at the point he indicates, but wherever you find a promise of early failure. Patients who are perfectly fair-minded will become impatient with you if you do not discover for them what they are incompetent to judge to be needed.

Another pitfall into which the dentist easily stumbles is susceptibility to the flattery of patients. A lady will say, after questioning your charge, "You know, doctor, we all have the most implicit confidence in you; couldn't think of going to any other dentist," etc. She may even be thoroughly unconscious of intention to take advantage of you with honeyed words. But it may not be amiss to reply, "I thank you for your candid statement, and shall always try to please you. At the same time, I should feel more gratified if you included in your expression of confidence my ability to make out a bill just right."*

It is a matter of first importance that the dentist should create an impression that he holds himself very high as a member of the community. Two things tend constantly to cheapen him, the first of which is his own willingness to be cheapened. He too often comes to feel that a little service requiring only fifteen minutes or a half-hour's time is not worth much. Thus it has come about that dentists all over the United States are charging fifty cents, even twenty-five cents, for plastic fillings. The dentist needs to consider that he is not the town barber, yet many place themselves on about that plane. Two or three dentists in a small town will set about cutting each other's throats by lowering prices, while their fellow citizens applaud. This is preposterous; dentists in small places should rather combine for their mutual advan-

tage, as they do in cities, in spirit at least.

The other influence tending to cheapen the dentist is relaxing from the professional standard, which again is of his own volition. Physicians, too, suffer from the same kind of laxity. Both dentists and physicians should remember constantly, have it inscribed as an imaginary maxim hanging framed on their office wall, that while merchants, farmers, manufacturers, have dozens of hands working for them, besides the adventitious aid of trade impulse and of natural growth, the professional man has only his single set of brains or fingers with which to serve his patient and make a profit for himself. What other man do we find in any community who pays two rents, hires two sets of servants, all with the proceeds of his own manipulative ability?

I believe it to be excellent policy to give outright your services to a reasonable number of deserving poor every year. Do not begrudge gold fillings; give of your very best. This gets abroad and is a good advertisement. It puts you in a position of perfect independence as to your fees for paying patients; they will conclude that one so generous can hardly take advantage of them. The suggestion is, however, tentative and hypothetical. I cannot claim to have expressly tried it, excepting after a limited fashion.

The dentist has a constant fight to avoid imposition. A patient will say, "I wouldn't be a dentist for any money." A farmer will tell you he wouldn't trade places with you. Yet both of these outspoken patrons oftentimes will not hesitate to dispute your charges. A dentist who wants to succeed must learn to talk to some purpose with such patrons.

It is because dentists so often fail in firmness and decision that they die, after long years of bending over their chairs, leaving nothing for their families.

*This is not my invention. I heard a dentist in Springfield, Ill., reply in about these terms to a lady who disputed his bill.

PROCEEDINGS OF SOCIETIES.

FIRST DISTRICT DENTAL SOCIETY OF THE STATE OF NEW YORK.

Monthly Meeting, October 1908.

A REGULAR meeting of the First District Dental Society of the State of New York was held on Tuesday evening, October 13, 1908, at the Academy of Medicine, No. 17 West Forty-third st., New York city.

The president, Dr. J. W. Taylor, being absent, Dr. B. C. Nash, the vice-president, occupied the chair, and called the meeting to order.

The Vice-president appointed the following as the committee to prepare resolutions on Dr. A. L. Northrop's death: Dr. W. W. Walker, Dr. S. G. Perry, and Dr. F. A. Remington.

Dr. WALKER, chairman of the Executive Committee, reported the program for the coming season. Dr. Walker also stated that the Eclectic Section on Orthodontia would begin its work by a lecture on October 29th at the College of Oral and Dental Surgery, the lecturer to be Dr. Charles R. Turner of Philadelphia. The fee for the course will be twenty-five dollars, payable in advance, although if anyone wishes to join the section and does not feel able to pay the twenty-five dollars at once, the committee will be glad to arrange for the payment of the same in parts.

The committee appointed by the president consists of Dr. Wilbur M. Dailey, chairman, Dr. Martin C. Tracy, secretary, Dr. J. W. Taylor, treasurer, and Dr. V. H. Jackson, consultant.

Dr. Walker then moved that all regular business except the election of members be passed, and the meeting proceed

at once with the reading of the paper of the evening.

Motion carried.

The paper by Dr. J. LOWE YOUNG, entitled "Early Treatment of Malocclusion of the Teeth," was then read.

[This paper was printed in full at page 397 of the April issue of the *Cosmos*.]

Discussion.

Dr. HERBERT A. PULLEN, Buffalo, N. Y. Dr. Young stated at the beginning of his paper that the reason why he chose "Early Treatment of Malocclusion" as his topic was because so many parents were advised by the general practitioner to defer treatment of their children until all the permanent teeth were erupted. In other words, Dr. Young wished to point out a reason why such advice should be discontinued, and to present a phase of prophylactic or preventive treatment, as it were, whereby it will be apparent that treatment instituted before the eruption of any of the permanent teeth will be finished by the time the permanent teeth fully erupt, operations for the correction of malocclusion being concluded at an age when the old-school operator was just beginning.

Whether or not the general practitioner of dentistry ever practices orthodontia, it is essential for his reputation, his dignity, and his keeping abreast of the times that he should be acquainted with the diagnosis of malocclusion, in order that he may give advice as to the

proper time of treatment, and give his patients service commensurate with the fee which he charges for consultation and advice.

It is evident that many practitioners of dentistry still cling to the older teachings and advice which seemed to them to be reasonable from the standpoint from which orthodontia was viewed in past years.

For ten years the "new school" specialists have been presenting a new viewpoint, which, although clear to the more observing minds, is still somewhat vague and obscure to the superficial student of orthodontia.

It is related of a certain traveler in the Swiss Alps, who was staying at an inn located on a mountain-top commanding a view of the surrounding mountain scenery—which is noted for its magnificence—that one morning as he was gazing in rapture at the beautiful scenery he was accosted by three ultra-fashionable women, armed with their Baedekers; one of the three asked him if he could tell them where the grand view which was described in the guide-book could be seen. The traveler, surprised at their lack of observation, replied, "Madam, there is no view here; the grand view is on Broadway, Picadilly, and the Champs Elysées."

It is not that the vagaries of orthodontia are so self-evident that they need no studious thought, but they are being gradually unraveled, and it is for us to observe the progress of today as it is pictured to us in such a presentation as we have had this evening.

Today the phase of the subject which the essayist has treated is the most important consideration of the specialist—the topic is valuable and timely; tomorrow we will be reaching forward into new unexplored fields of research, which may depend for their exploration upon the thought of today and yesterday. Therefore the thought of yesterday, today, and tomorrow must all be carefully followed, in order that our deductions may be made from an accurate knowledge of past and present theories and facts, made to

harmonize with the truth as it is discovered day by day and year by year.

What I shall say, in the way of emphasis only, of Dr. Young's valuable essay will be along certain lines of thought suggested by the essayist, viz, the lack of development of the dental arches in malocclusion, and the practical application of the Hawley method of arch pre-determination in the artificial development of these dental arches.

In almost every case of malocclusion it is primarily noticed that the dental or alveolo-dental arches are too small for the teeth, which in consequence crowd together and overlap in their efforts to attain full eruption. In other words, the full-sized teeth erupt into insufficiently developed alveolar arches, the degree of abnormal or arrested development varying from the overlapping of a single incisor to the most pronounced lack of development of the dental arch, in which the teeth are all inside of their line of occlusion, and in labial, lingual, torsal, and other forms of malocclusion.

To illustrate, see Fig. 1 [identical with "Fig. 16" of illustrations to Dr. Pullen's article in *COSMOS*, December 1908, "The Import of Certain Etiological Factors in Treatment in Orthodontia," p. 1311]. The cast at the bottom of the slide shows a deciduous arch at the age of four years, with the normal development proportionate to this tender age; the cast above it exhibits an undeveloped upper arch of a ten-year-old child, the arrest of development being noticeable in every portion of it. By macroscopic comparison, the arch of the ten-year-old child is hardly developed to any larger proportions than that of the four-year-old child, therefore we might say that not only has the arch of the ten-year-old remained undeveloped since the age of four, but even earlier, at a time when serious disturbances of inherent or allied functions may have caused such abnormal or arrested development.

In their ultimate position all unerupted permanent teeth are in normally developed dental and alveolar arches, arranged in accordance with the ideal of

normal occlusion; normal occlusion is the ultimate end of all developmental processes in the dental and maxillary arches, but if the alveolo-dental arch does not develop normally, but becomes arrested in growth at any early period of childhood, normal occlusion may never be attained.

Malpositions of the teeth, in general, are but objective symptoms of abnormal development of the alveolo-maxillary arches as a whole, consequently the early treatment of malocclusion resolves itself into the artificial development of the dento-alveolar and maxillary arches.

If, in the mouth of the child, we are assisting in the development of the dento-alveolar arch and thereby the underlying maxillary arch, *we are not straightening crooked teeth*, but we are performing preventive or corrective orthopedic operations; we operate upon the bony processes in which the teeth are embedded and stimulate them to such increased growth and development along normal lines that not only will there be room for the eruption of all of the permanent teeth, but the dental arches will be normally related, the floor of the nose developed, and the whole surrounding internal and external structures of the face will share in the normal processes of growth initiated by such treatment.

A number of years have elapsed since the treatment of deciduous malocclusions was begun, and the progress in the details of this treatment has been made along four distinct lines:

First, the time when treatment should be begun has somewhat definitely arranged itself. Since the roots of the deciduous molars inclose the crowns of the permanent bicuspid, any lateral pressure in expansion of the deciduous arch is transferred to the permanent bicuspid, and it has been found advisable to begin operations some little time before the loosening of the deciduous molars preparatory to their shedding, or else the looseness or absence of these deciduous teeth will render ineffectual any attempts at arch expansion until the eruption of the bicuspid, some time later.

Second, the extent of the expansion of

the partially deciduous arch can be somewhat accurately gaged by the Hawley method of arch predetermination.

Third, the appliances used for the expansion of the deciduous arches have been scientifically adapted for the treatment of small children, so that the greatest degree of efficiency with the least amount of discomfort is obtained.

Fourth, the features of retention of the deciduous arch have been carefully studied, with the result that stable retaining appliances can now be adjusted in nearly all cases which have been taken up before the deciduous molars have begun to loosen preparatory to shedding.

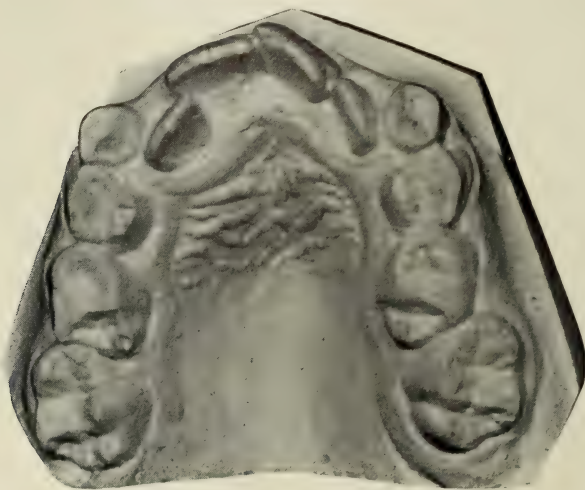
Fig. 2 ["Fig. 23" in December COSMOS, p. 1315] illustrates a case of arrested development of the upper arch of a child in whose mouth the deciduous canines and molars are still intact and firm in their positions, and capable of offering considerable resistance to an appliance for the lateral expansion of the arch, and of carrying with them the crowns of the permanent bicuspid and surrounding alveolar structures. Although the permanent central incisors and first molars have erupted, as far as development is concerned it is still a deciduous arch, and the Hawley diagram for a 0.39 central indicates that considerable anterior and posterior expansion is necessary at this time in order to secure sufficient development for the accommodation of the permanent teeth yet to erupt.

The result of treatment according to these indications is exhibited in the cast in Fig. 3 [*ibid.*, "Fig. 24," p. 1315], in which the extent of development is measured by the diagram of the predetermined arch. Further development of this arch may be safely intrusted to nature, provided that the amount of development already obtained is effectually retained as long as possible before the eruption of the permanent canines and bicuspid. The appliances used in this case were the plain expansion arch supported by molar clamp bands, using T ligatures upon the deciduous molars to prevent injury to the gums.

The retention of this upper arch after the expansion is shown in Fig. 4 [*ibid.*,

"Fig. 25," p. 1316], the deciduous teeth being used as resistance for the retaining appliance until such time as the carried out with the lower dental arch in this case, and there is every reason for believing that the remaining un-

FIG. 5.



absorption of their roots rendered them unfit for the purpose. The retaining appliance is in effect a lingual arch, con-

erupted permanent teeth will erupt normally in large and well-formed arches.

Perhaps you do not yet see the prac-

FIG. 6.



structed of iridio-platinum, soldered to four plain bands, located at such parts of the dental arch as will best support it.

Similar treatment and retention was

ticability of the Hawley diagram in cases of this kind. You may think that your expert eye and your good judgment will tell you when you have expanded enough.

If so, then your experience and mine may differ, for you will see by the next figure that the comparative uniformity

teeth, and the result of the anterior expansion is seen in the cast in Fig. 6. Two years later, the canines began to erupt

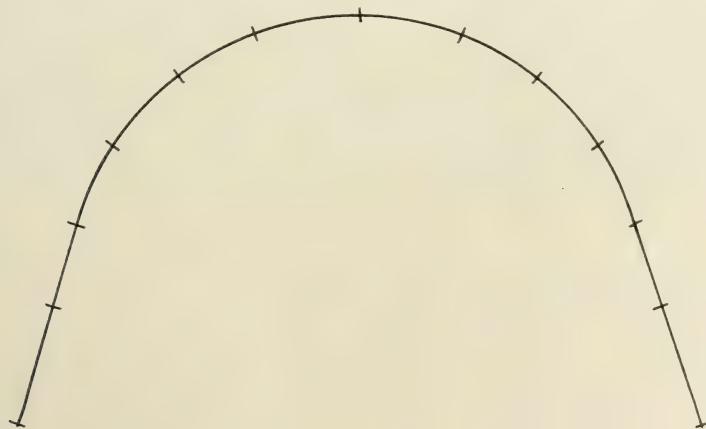
FIG. 7.



of the arch deceives the eye somewhat in respect to the amount of expansion required.

in labial occlusion, Fig. 7, having insufficient space in the arch, and requiring appliances to again be placed in position

FIG. 8.



The cast shown in Fig. 5 represents an undeveloped upper arch of a seven-year-old child. As this case was treated before the Hawley diagrams were in use, it was considered unnecessary to expand much in the region of the deciduous

for increased expansion in order to accommodate the canines.

The Hawley diagram which should have been used for this case is shown in Fig. 8, being that selected for a 0.34 central incisor.

Another case of still greater importance, being a distal occlusion of the lower arch (class II, division 1, Angle), is shown in three stages in Figs. 9, 10, and 11 ["Figs. 26, 27, and 28," December COSMOS, p. 1317], the model in the first figure representing the case before treatment; in the next, when the treatment was supposed to be completed, while the last figure represents the case after the indications of the Hawley diagrams were carried out in the still further treatment which was found necessary.

Treatment was inaugurated by first expanding the dental arches, opening up spaces in the upper arch for the permanent laterals, and in the lower for the permanent canines. When this treatment had progressed sufficiently far, intermaxillary elastics were applied from hooks upon the upper expansion arch to the distal ends of tubes upon the lower molar clamp bands, in order to shift the occlusion from distal to normal.

After eight months' time had been consumed in these operations by proceeding slowly and gradually in order to simulate a natural developmental process, the conditions in the two arches appeared as in the model in Fig. 10 [*ibid.*, "Fig. 27"], when, from diagrammatic measurements taken at that time with the Hawley charts, it was found necessary to still further expand both arches, the final result in occlusion being seen in the model in Fig. 11 [*ibid.*, "Fig. 28"].

The Hawley diagram for a 0.39 incisor called for an arch the size of which, in comparison to that which was first obtained, may be seen by a study of the superimposed diagrams in Fig. 12 [*ibid.*, "Fig. 29"], the cast at the left representing the first result, and that at the right the final result of arch expansion to coincide with the diagram. Especially in the molar region the lateral development at the end of the first stage of treatment did not seem to be proportionate to that produced in the anterior part of the arch.

The expansion of the lower arch was carried out without measurement, following the upper arch as a guide in the extent of expansion to be accomplished.

Figs. 13, 14, and 15 [*ibid.*, "Figs. 30,

31, and 32"] illustrate in the lower arch the same three stages of progress as were gained in the upper arch.

The scientific value of this method of arch predetermination could not be better illustrated than in this case, where, in all probability, the great amount of expansion indicated by the diagram would not have been carried out without such a predetermination of the normal sized arch for the case.

The before-and-after-treatment profile pictures were taken eighteen months apart, Figs. 16 and 17 [*ibid.*, "Figs. 35 and 36"], and the development of the middle as well as the lower third of the face is no doubt due to the stimulus to normal growth resulting from the treatment described.

The front view of the face before and after treatment is shown in Figs. 18 and 19 [*ibid.*, "Figs. 33 and 34"].

Such a sequence of operations as were performed upon this seven-year-old boy cannot fail to be of the greatest benefit in the restoration of normal functions and growth of the dental and maxillary arches through scientific arch expansion and occlusal restoration.

There is but one chapter more to be added to this method of treatment, and that is the final result in occlusion when all of the permanent teeth have erupted, the case being retained in the meantime. A few years more and such final results of this treatment will be ready for publication, but already the indications are that that is the ideal treatment of malocclusion which is instituted at an age when the dental arch is undeveloped and few, if any, of the permanent teeth are erupted.

Dr. AINSWORTH. I had the pleasure of reading this paper last week, and have listened to it this evening with added pleasure because of the personal equation which has entered into it. I find much to commend and very little to take exception to.

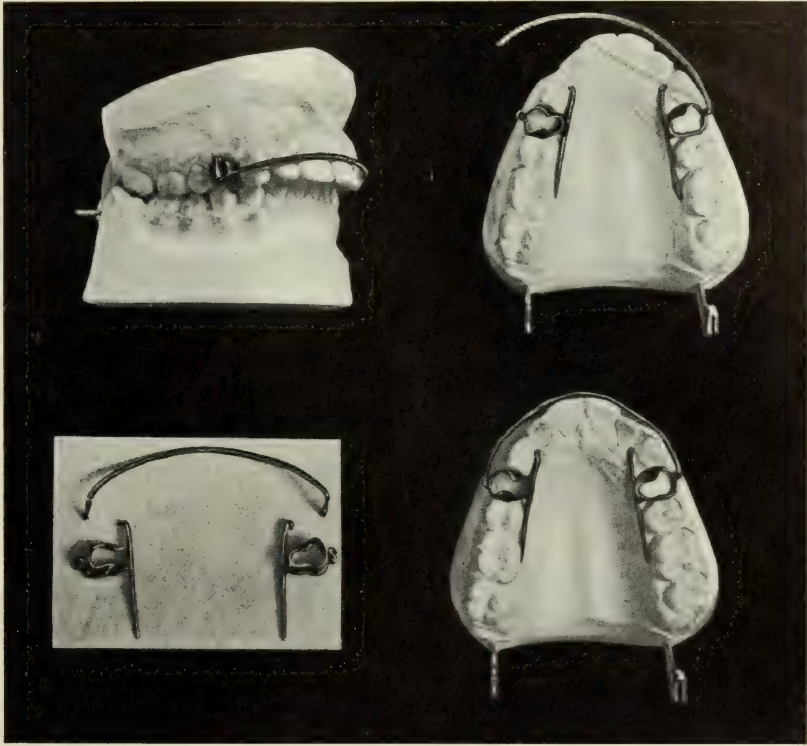
The advantages of early treatment are so self-evident that it would seem to permit of very little argument—provided the patient is a tractable one—and may be summed up as follows: (1) Sim-

licity of the work. (2) Teeth are more easily moved into position. (3) The roots, developing in correct relation, are more likely to retain their position without the wearing of retaining appliances, with the consequent less liability of injury to the permanent teeth. (4) The influence upon the facial development.

other teeth. Why, then, should we delay its proper guidance if it is found to be out of position? Does not the old adage, "A stitch in time saves nine," hold true in this case?

I agree with the essayist that the first requirement in the consideration of a case is a perfect set of study models, which

FIG. 1.



Against these advantages we may put lack of appreciation on the part of the little patient and consequent difficulties in handling the case, with the somewhat less experience in devising appliances applicable to the deciduous teeth.

I believe it is pretty generally conceded that the first or principal molar is the most important tooth in the arch, and therefore its relation to its opponents is of equal importance. This tooth seems to stand as the buttress to the dental arch, the tooth which in large measure influences the positions of all the

can only be obtained from plaster impressions, to which we may constantly refer. But such models are rarely found; the busy man hasn't time to spend on them and the majority do not know how to make them, and, so far as I know, the colleges do not teach it as an art. I confess that the temptation to the busy man to take his impressions in compound is very great.

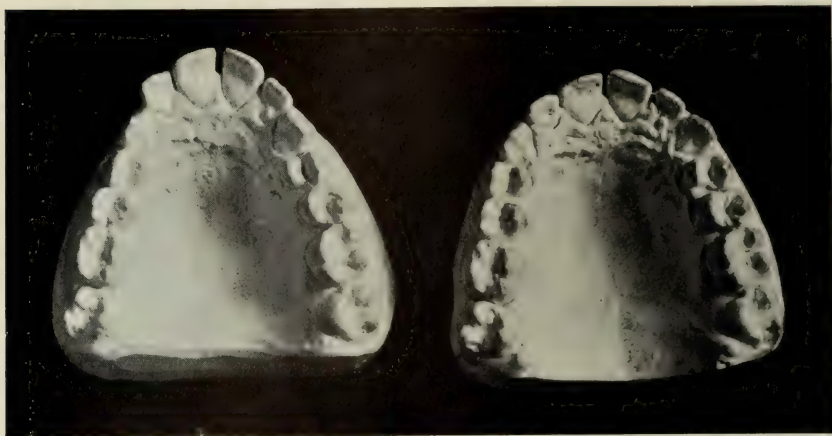
I am deterred from accumulating an intelligent collection of models through the difficulty of getting such models made, and I have been unable to con-

vince my little patients that plaster is so much more of a delicacy than modeling compound.

In regard to extracting, I believe the

As to the etiology, abnormal development of the arches seems to be on the increase; it seems to go hand-in-hand with an abnormal civilization, if you

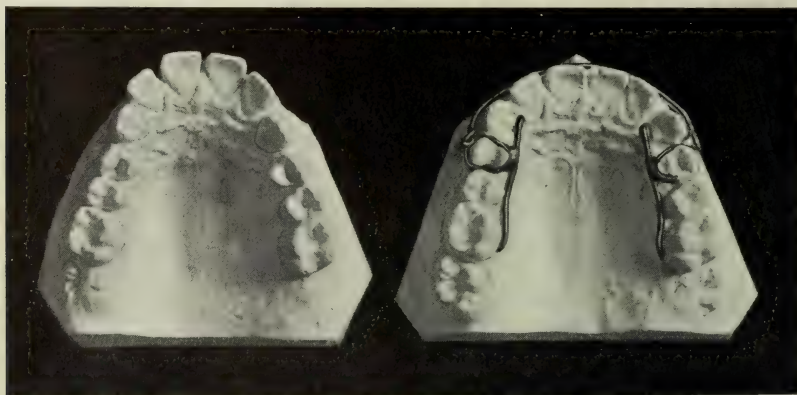
FIG. 2.



cases are rare indeed where it does not precipitate a greater evil than it corrects, excepting, of course, where there are supernumerary teeth, or in an adult

please; the farther we depart from the simple life, the more trouble we experience physically. May we not eventually be civilized into barbarism?

FIG. 3.



case where earlier extraction has been resorted to; and I will except the third molars, as I believe many adult mouths are far better off without than with these teeth, provided all the other molars are present.

In the animal and vegetable kingdoms we endeavor to breed only the best; no pain or expense is spared to develop all that nature will vouchsafe. But how is it with the human race?

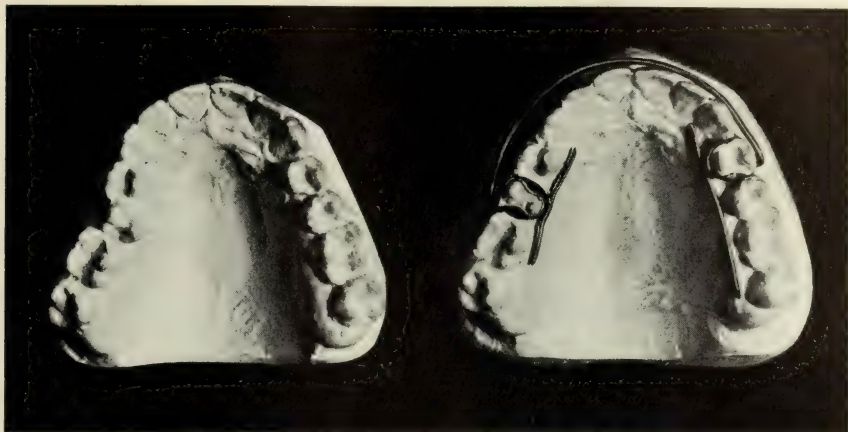
The child is born, that's all. It is con-

signed to the nurse and the bottle, and development begins, but not under natural conditions. The nursing at the breast, where the muscular force of the

more natural conditions, in return there will be a noticeable improvement in the dental arches and the facial development.

I have been called upon to treat a great

FIG. 4.



tongue is exerted directly against the roof of the mouth in the act of drawing the sustenance, is dispensed with, and in its place is the bottle with its rubber

many cases residing at a distance; this has caused me to give much study to the development of self-acting or automatic appliances, which would require less con-

FIG. 5.



nipples, so arranged that the child has little to do other than swallow, and thus the natural conditions which go to develop the arch, broaden the nasal seat, and develop the adjacent tissue are inactive. When children are reared under

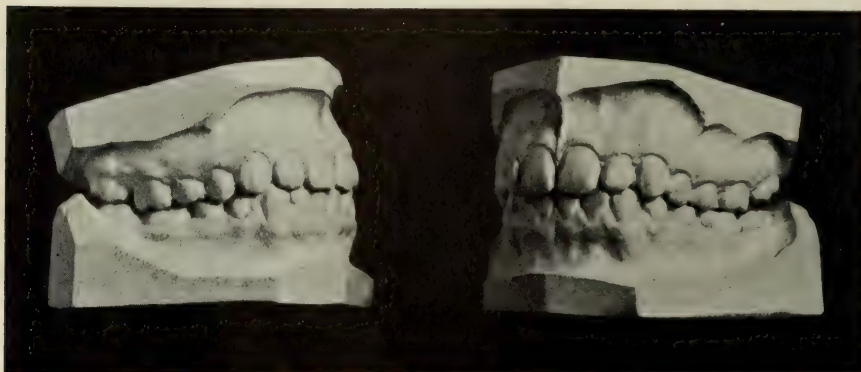
stant attention than those ordinarily in use, and as these appliances are particularly applicable to young cases I will show you two simple ones from which I have derived much satisfaction.

Probably ninety per cent. of the cases

of malocclusion require a spreading of the arch as a preliminary to the proper alignment of the teeth, and the picture now on the screen (Fig. 1, p. 571) il-

teeth outward it will not slide down the inclined plane presented by the palatal surface of that tooth; for should this occur it would result in a troublesome

FIG. 6.

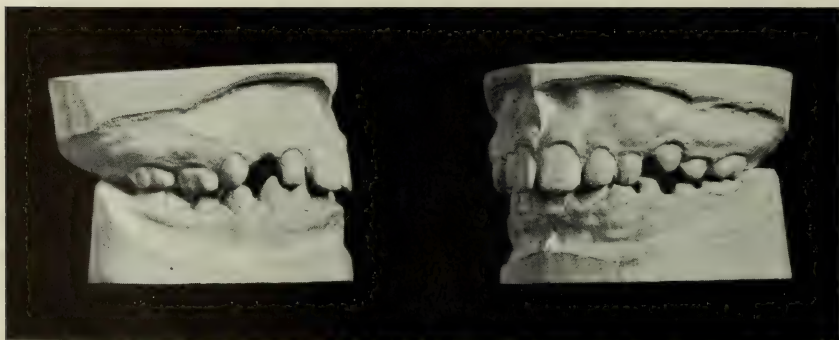


lustrates a very simple appliance for automatically doing that work. It is made up of bands to be cemented on, usually to the first bicuspid, upper or lower, as the case may be, with a palatal wire soldered to it of a length sufficient to engage all the

elongation of the bicuspid banded, instead of accomplishing the moving of the canine out.

To the buccal side of these bicuspid bands are soldered small vertical tubes, to receive the ends of a 16-gage spring

FIG. 7.



teeth to be moved on that side. If intending to spread the canines, as is usually necessary, the forward end of this wire must be turned at a right angle and carried well up under the gum so as to engage this tooth in such a manner that when pressure is applied to move the

wire, so bent and adjusted as to apply pressure to widen the arch when sprung into place. When properly made and adjusted the only attention this appliance requires is the occasional bending of the spring wire so as to give more or less force, as may be desired. You under-

stand that this spring wire is readily taken out and replaced.

This appliance is equally applicable to the deciduous teeth for widening the arch, and also readily lends itself to the addition of other features, such as ligatures on the front teeth or even intermaxillary elastics, should they be desired.

The next picture (Fig. 2) shows a case where this appliance was put on November 21st, and with practically no attention produced the change as shown on March 1st.

The next picture (Fig. 3) is another case as it appeared March 1st and June 18th, with the appliance on.

Another one, where we have an in-standing second bicuspid (Fig. 4); the resistance of five teeth on one side was placed against that of the one misplaced on the opposite, with the result shown in the next picture after eight weeks. You will observe that the space is hardly sufficient to accommodate the tooth when in position; the pressure to move it was therefore considerable, and as the patient was away at school, I put on the little palatal wire to prevent its being carried too far when it should have pro-

The next case presents the front teeth badly hooked in, the canines rotated, large overbite, and occlusion of the lower distal to normal. (Fig. 5.) A spread-

FIG. 8.



ing appliance was put on February 9th; this was changed to the ordinary arch band April 5th, rotating bands put on the canines April 20th—eight visits—and an inclined-plane appliance put on

FIG. 9.



gressed sufficiently to throw off the lateral pressure. The only attention required was to bend this wire off a bit now and then, as it brought up against the adjacent teeth.

July 12th and worn a year, when it was removed and impressions taken for the models now shown (Fig. 6), presenting about as perfect an occlusion as could be desired.

The next case presented is that of a boy who was soon to go to a boarding-school at a distance, where it would be difficult for me to see him. Arch of normal width, large overbite, lower teeth occluding distal to normal, deciduous molars just giving way to bicuspid (Fig. 7). An inclined-plane appliance was made and adjusted, as you see (Fig. 8), on January 7th; the next visit was on July 8th, and the appliance was removed on October 3d, and impressions taken from which these models were made, showing perfect relation and occlusion. (Fig. 9.)

Dr. GOUGH. The beauty and harmony of perfect or normal occlusion of the

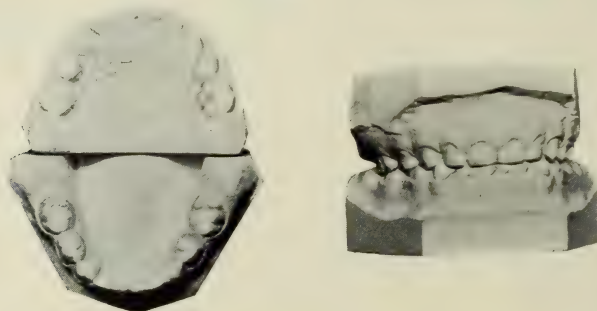
stick by the dentist, and it seems hard for him to give up these old ideas.

I now show some lantern slides.

Fig. 1 shows the casts taken of a child of six years of age. I wish to call your attention to the lack of developmental spaces, particularly in the lower teeth. At that age there should be considerable development of the arches, and yet many of the members of the dental profession, looking at these casts, exclaim, "What a beautiful occlusion, and what a perfect set of teeth!" which is perhaps true enough, but does not give any intimation of the incipient malocclusion which is indicated by such a condition.

The essayist spoke of the ease with

FIG. 1.



teeth is appreciated more and more as we come to realize the scope of orthodontia and its possibilities. I believe that it would be of great benefit to dentists in this country if this subject could be brought up before every dental society in the United States every six months for the next five years, because with all that has been said on this subject in the past there still seems to be a tendency on the part of the great majority of our profession to ignore the matter of orthodontic treatment until the permanent teeth are fully erupted.

Time and again we see mothers who seem to have better sense in this matter than their dentists. The physician or the rhinologist calls attention to the necessity for early treatment, but somehow or other the old teachings and fallacies

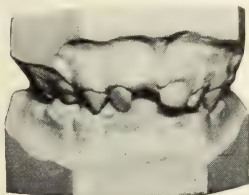
which plaster impressions are taken, and Dr. Ainsworth in discussing that subject seemed to think that it is much easier to take a modeling compound impression. The technique of taking plaster impressions is as difficult as any other operation in dentistry that requires thorough study; it must be learned, but once the technique is acquired I should think anyone would prefer to take a plaster impression, and could do it with less discomfort to himself and to the patient than in any other way. When taking a study model, I have been frequently asked by patients to take it in plaster rather than in modeling compound.

Fig. 2 shows plaster casts made from plaster impressions taken of a child twenty-seven months old. The lower second deciduous molars, as you see, have

not yet erupted. The child was brought to me at the age of nineteen months to

preparing to treat the case now, and I wish it to go on record as one of the

FIG. 2.



see what could be done to prevent the space closing where one of the deciduous

earliest cases presented for treatment in orthodontia. It is interesting because it

FIG. 3.

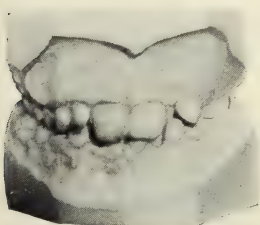
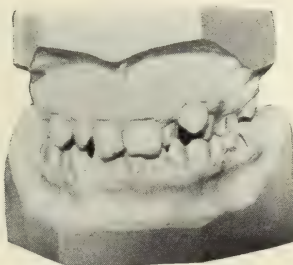


FIG. 4.



central incisors had been lost through an accident. It was also noticed that there

shows that plaster impressions can be made from even small children, and you

FIG. 5.

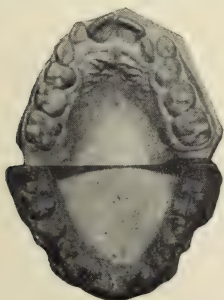
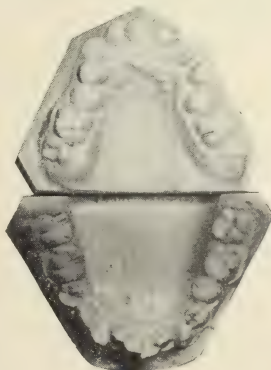


FIG. 6.



was a considerable upper protrusion, due to the use of a baby-comforter. I am

all know that if I had taken one of these impressions and the child had been hurt

or frightened, I could not easily have secured the other. It was an easier matter to get the second impression of that baby's teeth than it was to get the first.

One of the most striking effects of delayed treatment is shown in Figs. 3 and

gually is that the upper arch was actually narrowed thirteen one-hundredths of an inch. (See Figs. 5 and 6.)

We hear a great deal nowadays about "arrest of development," but I believe this is the first case reported showing that

FIG. 7.

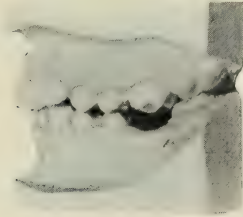


FIG. 8.



4. The casts shown in Fig. 3 were made from impressions taken when the patient was between ten and eleven years of age. At that time only one of the deciduous molars had been lost, and the left lateral incisor was the only tooth in the upper arch which was in lingual oc-

clusion. The upper arch can and does sometimes contract.

Here is a case where the width of the arch has actually diminished during the very years in which the child's most rapid growth and physical development were taking place.*

FIG. 9.

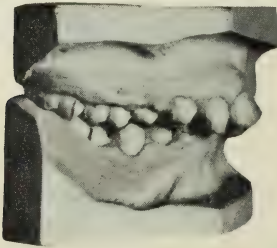
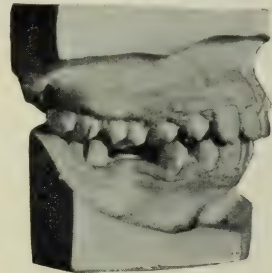


FIG. 10.



clusion. A little over three years later the child's mother began to lose confidence in the wisdom of her dentist's advice, namely, that nature would correct it, and again came to me, when I took impressions and made the casts shown in Fig. 4.

It will be seen that instead of one tooth in lingual occlusion on the upper arch, there are now four, one of them, the upper left first molar, having been in normal occlusion when the previous impressions were taken, and the remarkable thing about this tooth being forced lin-

This next case is one that shows how rapidly the teeth travel, if the space where a tooth has been lost is not preserved. The cast in Fig. 7 was taken just six months before the cast in Fig. 8. The tooth was considerably decayed, and the dentist said it could not be saved. The bicuspid had already tipped back somewhat on account of the loss of contour of the molar; with such a good start

*Since this discussion the author has been able to secure casts of another case in which the same contraction took place.

they traveled very rapidly after the roots of the molar were removed.

Fig. 9 shows the casts of a case in which the malocclusion was directly due to the extraction of the lower right first molar, and Fig. 10 shows the restoration of the space and the establishment of normal occlusion.

In regard to Dr. Ainsworth's remarks that he finds it difficult to adjust appliances for these young children, I would say that I should very much prefer young children to older ones. We have much less trouble with patients from five to eight or nine years, and they are much easier to treat for the correction of malocclusion at that age than when they are older. They do not mind the appearance of the appliances so much, the soft tissues tolerate them better, and the teeth themselves move with little or no soreness.

Dr. DAILEY. The subject of the paper presented tonight by Dr. Young is one that I have had in mind for many years. I have expressed my views in a paper entitled "Malocclusion of the Deciduous Teeth," which I read before the Odontological Society in 1905. I therein stated that development, or rather lack of development, would affect the occlusion of the permanent teeth. I also found that malocclusion of the deciduous teeth is not confined to one arch, but I have seen it in both, not only on one side but on both, and I claimed that malocclusion exists in the same proportion in the deciduous teeth as in the permanent ones. The reason why this is not observed is that malocclusion is not so noticeable in the deciduous as in the permanent teeth. This is due to the shortness of the crown of the tooth and to the cusps of the occluding planes not being so well defined.

The operator who tries to solve the problem of malocclusion must first ascertain the cause; if you have failed with cases of twelve or thirteen years of age, you might determine that you have waited too long before you attempted a correction. I wish to call your attention to the fact that if we delay corrective methods until after seven years the apices of the deciduous molars have started to

decalcify. Therefore the period during which development should take place is from three and one-half to seven years, before the decalcification of the deciduous roots begins. If you do not start your correction at that period of development, which nature has clearly indicated, how can you be confident that if you wait until the tenth or twelfth year you can reproduce the proper bone development that nature intended?

Dr. Young called particular attention to the fact that the malposition of a single tooth is a mark of malocclusion. With all the deciduous teeth in the arch we are able to judge very closely the position of the permanent teeth; if we are uncertain, we can be greatly assisted by an X-ray photograph.

Dr. OTTOLENGUI. I had not brought any slides with me, but when I saw my dear old friend and preceptor Dr. Kingsley here, I went home and got the slides of one case which I should like to show you as the result of the teaching I received from him, and of the teaching I have received from the disciples of the Angle school.

All the pictures shown tonight represent an argument in favor of early interference, and yet unfortunately this new era is only dawning, and as Dr. Pullen has said, it will require a number of years for us to have any abundance of material with which to show finished results. For that reason I think that what I show will be of particular interest.

This slide (Fig. 1) is a case of class II, division 1, of the Angle classification, and, as the dentition would indicate, one of an exceedingly young age. You see in the upper jaw only the permanent central incisors and the first molars. In the lower we have the four incisors, and the first molars are just peeping through; but this little child is suffering from a lack of development, and whereas from the stage of her dentition she should be seven or eight, she was really ten when these models were taken.

This slide (Fig. 2) shows the case after treatment.

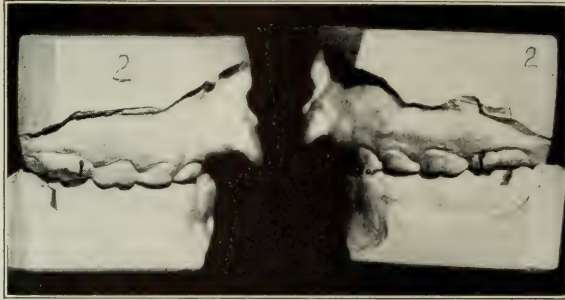
This slide [exhibiting] shows the profile before treatment, and this [exhibit-

ing] the profile after treatment, which occupied nine weeks. [Photos cannot be published.]

I wish to speak of the model that Dr. Gough showed, where he put the teeth

treated only nine weeks was that at the end of the eight weeks the parents notified me that they were going to leave town. This case was primarily to be treated according to Dr. Angle's teach-

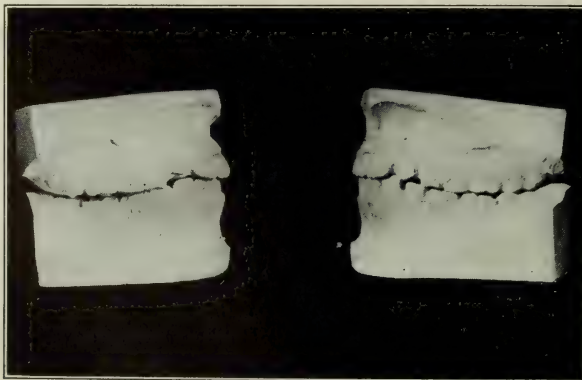
FIG. 1.



in normal occlusion, and yet still had an undeveloped chin; he said that if the case had been treated earlier, the result would have been better. I called your attention to the narrowed condition and the abraded surfaces of the upper canines,

ing, but when I found the readiness with which this mandible moved forward, and that the child was going to leave me, I conceived the possibility of utilizing a retaining device for continued treatment. A device was made with the in-

FIG. 2.



and the abraded labial surfaces of the lower canines, which show the mandible was imprisoned so that it could not come forward and take its proper position in mesio-distal relation. As soon as the upper arch was widened, the jaw naturally came forward to a considerable extent. The reason why this case was

tention of retaining all that had been gained, while intermaxillary force could be continued—my idea being that with intermaxillary force it would be much more comfortable for the child to bite forward. While the picture shows her normal comfortable bite nine weeks after the first treatment, nevertheless she could

place her mandible back into distal occlusion. I cannot show you slides at the present time, as she has only returned from Europe this week. She still has her deciduous molars, and the appliances that were put on fourteen months ago, and now she cannot move the jaw distally. It is too deep a subject to discuss tonight, whether there has been an elongation of the ramus, or of the entire mandible, or a change in the glenoid region; but that child cannot now move the lower teeth into distal occlusion. So that by early interference and continued intermaxillary force we have accomplished this change by following Dr. Kingsley's old recommendation to "jump the bite."

Dr. V. H. JACKSON. I should like to say quite a little regarding this paper, for it is a subject which we all appreciate, and which is very opportune. I brought models, and expected to show a considerable number of slides this evening, but cannot do so as the hour is very late.

We orthodontists have educated the public up to the present, giving our best thoughts, and we are here this evening to compare notes and show results of early treatment in moving the teeth and to point out further plans that will serve our patients by our advising early interference in moving the teeth, in the same way as we should begin early in changing the shape of a plant, while the fiber is still tender and can easily be trained into shape. In doing this, however, we do not always follow nature's exact plan with the individual or the plant.

I am sure that we all agree with the essayist, that "early interference" is essential, and that the general practitioner and the parents should be made aware of the advantages which the child derives from being operated upon, if necessary, for early correction of malposed teeth, even though in some cases heredity and natural tendencies may have to be overcome and resisted by long retention of the teeth.

The early regulation of the teeth was encouraged by Kingsley and by others.

In a paper read before the American Dental Association in 1890 (see Trans-

actions, page 201), I stated that "It is the opinion of the writer that each tooth should be encouraged to take a correct position in the circle of the arch while erupting (or as soon thereafter as practicable) in order to promote the proper development of the jaws, for the teeth next to be erupted are thus more likely to do so in their proper position and order."

The essayist states that "By the time the permanent lateral incisors begin to erupt, the curve in the arch line between the mesial surfaces of the canines should be as great as the combined width of the four incisors." When there is insufficient room for the proper eruption of the incisors, the method of assisting nature will consist in increasing the distance between the canines by expanding the arch laterally to make room for them, which interests us especially. In my writings I have described the methods I employ for this purpose.

See Fig. 1, A and B. Miss D., age six years. It will be noted that the space between the upper deciduous canines is insufficient for the normal eruption of the permanent incisors. The deciduous incisors are being held closely together by the right and left canines—that is, the arch is too narrow, there being insufficient space between the canines for the eruption of the permanent incisors. The anterior part of the upper arch is narrower laterally than the lower arch, so that the front teeth of the lower arch describe a larger circle, and when in occlusion rest behind the upper deciduous canines, causing the upper incisors to protrude considerably in front of the lower incisors. Their position requires that the upper arch be expanded laterally in the region of the upper canines, and the lower arch moved forward to bring about a good occlusion, in that manner *equalizing the arches*.

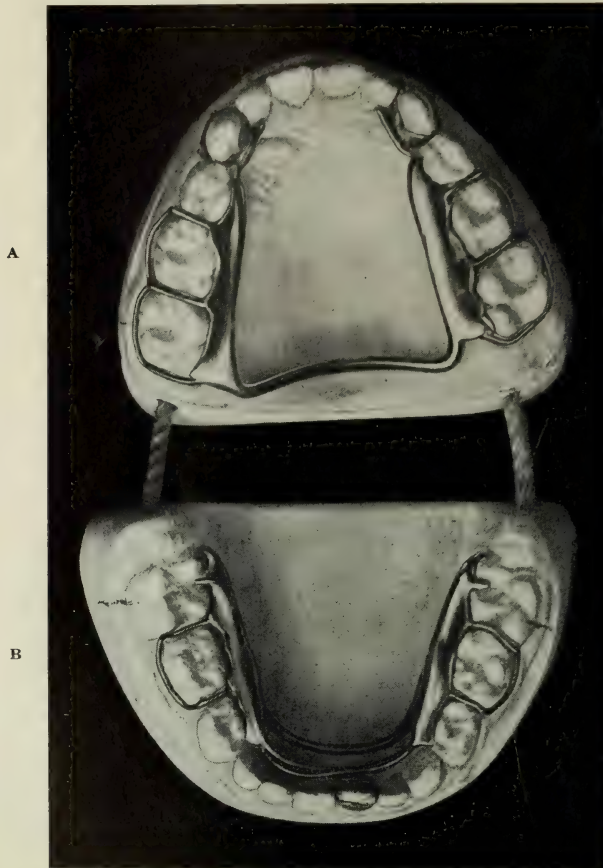
Fig. 1, A, shows the form of the device employed for expanding the upper arch. The appliance is made with a base wire following the palatal curve, crossing the arch opposite the distal surface of the first permanent molars; the arms or ends of the base wire are bent forward

and soldered to the anchorage of the appliance, or to the partial clasps and spring-clasp attachments, which pass over the second deciduous molars. Additional anchorage is gained in some cases by extending a wire clasp from the distal part of the anchorage portion of the appliance

ward about once a week. This gradually expanded the arch—that is, increased the distance between the canines and consequently increased the distance between the right and left molars.

Fig. 1, B, shows the lower arch and an appliance in position.

FIG. 1.



around each of the first permanent molars.

A collar with a lingual lug is cemented to each of the deciduous canines, and a finger spring is extended forward from the anchorage portion of the appliance on each side of the arch, and passes underneath the lug on the collar; force for laterally expanding the anterior part of the arch was secured by bending the arms and the anchorage portion a little out-

The lower incisors were moved outward by finger springs extending forward on either side from the anchorage portion and crossing to the opposite side of the arch.

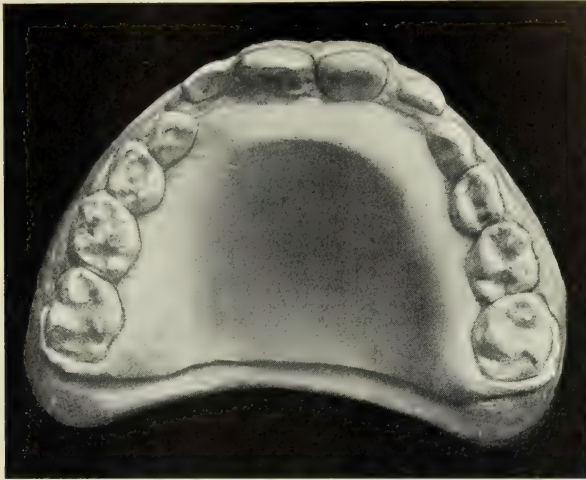
The free ends of these finger springs were supported by a collar with a lingual lug cemented to one of the central incisors.

Force should be applied gradually, always using the pencil tracing, never bend-

ing any of the springs on mere calculation.

are sure to close in front of the upper incisors, bringing about a prognathous

FIG. 2.



Some other reasons for the early regulation of the teeth should be mentioned here. If the lower lip is resting against

condition; the longer they are allowed to remain in this position, the more prognathous the mandible will appear.

FIG. 3.



the edge of the upper incisors, or back of them, the progressive protrusion of the upper teeth is certain. Again, if the edge of the lower incisors rests on the edge of the upper incisors when in occlusion, the lower incisors sooner or later

When there is insufficient space in the dental arch for the permanent teeth to take a normal position in their eruption, it is always important that the arches should be expanded; the movement must be gradual, for at this time the jaws are

in their developmental stage; gradual expansion stimulates and encourages the development of the bony parts desired. The force applied in the expansion at the same time increases the size of the nasal openings, permitting more free nasal breathing, which is equally important. The expansion of the arch at this time is less likely to tip the teeth from their natural angle than when expansion is undertaken later in life, as gradual force brings about the necessary

47 mm. In order to facilitate mastication, a palatal vulcanite plate was inserted, as shown in Fig. 2. It was so shaped as to afford good occlusion with the lower teeth.

In order to expand the lower arch, a removable appliance was constructed as shown in Fig. 4. The anchorage portions were connected by a lingual base wire, the ends of the base wire were soldered into the anchorage portions opposite the second deciduous molars, and

FIG. 4.



change in the size of the arch more readily by stimulating its development.

Figs. 2, 3, 4, and 5 illustrate the case of Master S., age seven years. All the deciduous teeth are in position excepting the four incisors. The upper arch was very large; the lower arch was much contracted, all the teeth of the lower arch closed entirely inside the circle of the upper arch. There was so much difference in the size of the arches that there was no occlusion of any of the lower teeth with the upper, rendering it impossible for the patient to masticate his food. The child was anemic and nervous, his case being a very extreme one. The lateral measurement between the first permanent molars of the opposite sides of the lower arch was 32 mm., while the lateral measurement between the first molars of the upper arch was

finger springs were arranged extending forward to move the incisors and canines outward. Gradual force was applied which moved the teeth and at the same time stimulated normal development of the parts.

Fig. 5, A and B, illustrates the expanded lower arch in comparison with the upper arch after the eruption of the permanent teeth.

The lower incisors were on too high a plane and are being depressed by a plate-metal shelf passing back of the upper incisors. The shelf is soldered to the regulating appliance, which is removable.

In Figs. 6, 7, 8, and 9, taken from my book on Orthodontia, the relationships of this case are shown diagrammatically.

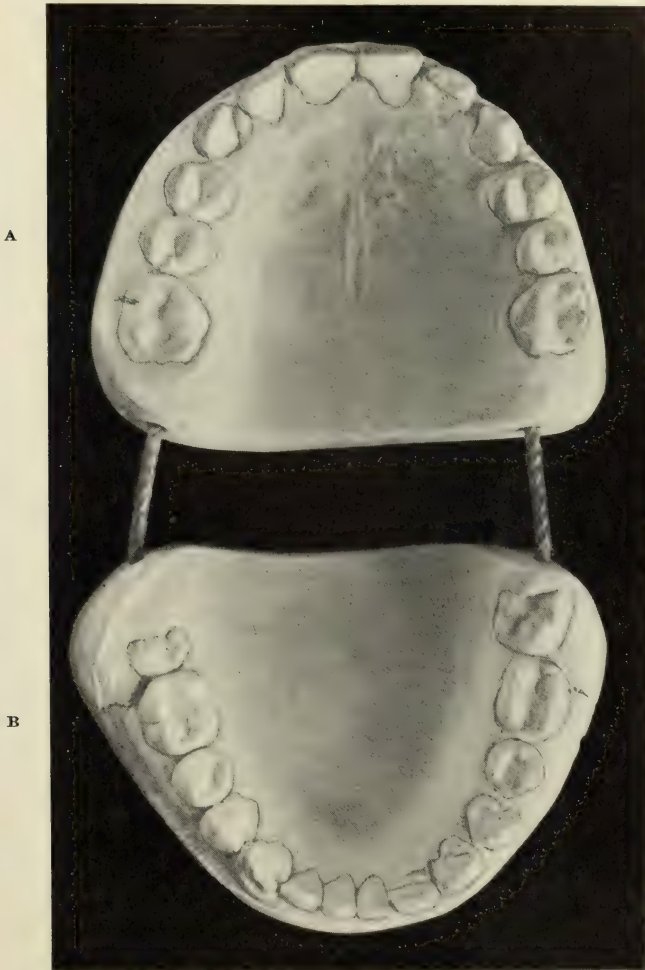
It will be observed that the lower teeth have not been tipped outward in the pro-

cess of expansion, but are more erect than usual.

When a child is at rest and his lips remain apart at all, it can generally be concluded that he is breathing through the mouth, while he should be breathing

of Paris in taking impressions of the teeth of a child two years and ten months old, or whether he would prefer compound. I have taken compound impressions in children of that age for the regulation of their teeth, without dis-

FIG. 5.



through the nose in order to stimulate normal nasal and maxillary development.

I cannot agree with the essayist's opinion that plaster of Paris is more agreeable to the patient than modeling compound for taking impressions, and that "the younger the patient, the more likely he is to prefer plaster to compound." I should like to ask if he would use plaster

comfort to them. Imagine what it would mean to a child of that tender age and to the operator to struggle with plaster of Paris. I recommend that plaster impressions of the teeth be taken before and after regulation in all patients of suitable ages and temperaments; but for the working models in making regulating appliances, I prefer to take careful impres-

FIG. 6.

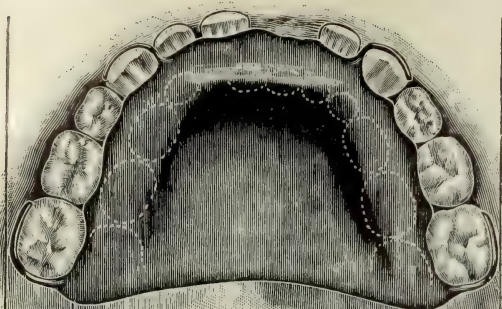


FIG. 7.

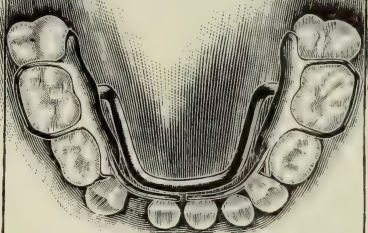


FIG. 8.

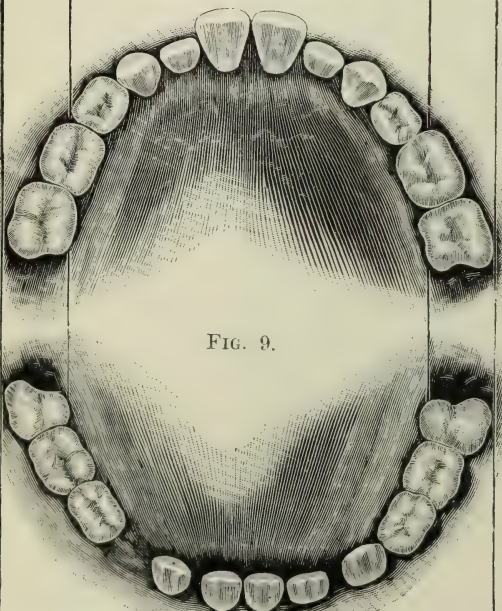


FIG. 9.

Oral prophylaxis is practiced by dental specialists and by general practitioners of dentistry. I have advocated for several years that the general practitioner should be thoroughly qualified to diagnose any abnormal condition of the mouth and the dental arches; in other words, that he should have a sufficient knowledge of "orthopedia of the face" to at least properly advise a child's parents. I like the term "orthopedia of the face" better than the term "oral prophylaxis," as applied to the watching and mechanically stimulating the proper development of the dental arches of the child, and guiding erupting teeth into place; since *orthopedia* means the prevention or correction of deformities, while *prophylaxis* means the preservative or preventive treatment of disease. In my opinion unless the meaning of the word prophylaxis is broadened, it does not appropriately apply to and include the eruption of the child's teeth, their movement, or the expansion of the dental arch.

The most important point which in my opinion the essayist has brought out in his paper is that he advocates the movement of the teeth while the bones are in their active development; but both the specialist and the practitioner should be able to point out to the parents the diseased condition that is causing maldevelopment.

I am glad that the essayist avoids using ligatures on deciduous teeth, as injury to the gum usually causes their premature resorption. I would use collars with lugs, spurs, and other apparatus as need be, which would not injure the gum. See the illustrations.

DR. FARRAR. I have been much interested in what has been said here tonight. But the hour is late and there has been so much ground covered by the essayist and others, that you all must be too filled to take in with safety much more. Indeed I think the speakers have gone over sufficient territory to fill six evenings, consequently I think that I should not talk at all.

You know that it is not wise to eat too much at one time, nor to eat much late at night. There is also such a thing

sions with modeling compound. Of course these must be practically exact.

as taking too much intellectual food at one time; the eye can become fatigued, and the ear tire of hearing, therefore I ought not to attempt to add to this probable condition at this late hour. Dr. Young's lecture was not only interesting but instructive. If I be allowed to say it, I think we all should have been pleased if Dr. Young had shown us in pictures the mechanisms used; in other words, if he had demonstrated how he performed his operations. Dr. Ainsworth in his remarks gave us a clear presentation of this aspect; but to go tonight over even half of the ground covered by these two gentlemen and others, treating it in detail, would not be feasible.

Dr. YOUNG. Dr. Pullen said some very nice things, but I think he said most of them because I am larger than he is. I do not think he meant half of them.

Dr. Ainsworth spoke of the number of visits which I did not bring up in my paper. That, I believe, should not enter into the subject at all. I was always taught that if a thing is worth doing, it is worth doing well. I do not care if it takes one visit, or five hundred; if I undertake a case, I count on doing it to the best of my ability no matter how many visits it takes. Dr. Ainsworth finds it difficult to induce the patients to come. I believe that to be a question of individuality. If the patient comes and says, "Doctor, I can only come to you so and so often," I say, "Very well, then, I cannot treat you. If I am to treat this case, I must do it as I see fit, and if you do not want me to do it you must get someone else." I have had them defer a trip to Europe, and I probably hypnotized them into believing I was *the* man to do the work. If a man feels confident that he can make an appliance and lets the patient go for six months, as Dr. Ainsworth says he does, and obtains the result desired, I have no objection to his doing so, but I should not think of treating children that way. It is too much like absent treatment for me. There is too much at stake to induce me to take such chances.

Dr. Ainsworth also spoke of the busy men not being able to take the proper im-

pressions. If he is too busy to do that he should not undertake orthodontia. He says that we should all have good models, that good models are necessary; then it is up to him to make them, and to let the people pay for it, as they would do for any other service rendered.

It is impossible to obtain absolutely perfect reproductions of cases of malocclusion with modeling compound. You can get something approximating the existing condition, but you cannot secure an absolute reproduction. You never hear men who take plaster impressions apologize for their models, and I do not think that we should do anything for a human being that we must apologize for.

Dr. Gough showed something of interest to me, namely, the first real evidence that I have ever seen of a contraction of the dental arch. I have heard men speak of the arch being contracted, but in probably ninety-nine per cent. of the cases these men did not mean a contraction of the arch, but a lack of development; Dr. Gough has convincingly proved that there was really a contraction of the dental arch.

Dr. Dailey accused me of saying something that I did not say. As I understand him, he quoted me as saying that the turn of a single tooth did not indicate malocclusion. I did not say that. I said we do not think that it is beneficial or advisable to rotate maltreated incisors of the deciduous set.

Dr. Jackson spoke of plaster impressions for very young children, and said that I made the assertion that the younger the children the more likely they are to take to plaster than to compound. My experience has been that if I attempt to take a modeling compound impression from a very young child, the heat of the modeling compound will frighten him. Children are afraid of the heat; they are not used to it. If you say to the child, "I am going to mix some nice clean plaster, and put a little in your mouth," and explain it all to him beforehand, and get him interested in what you are doing, you will have no trouble, and when you remove the plaster from the mouth you have something that

you can rely on and that you cannot obtain otherwise.

Dr. AINSWORTH. If it is not too late, I desire to be correctly understood as regards impressions and models. It is true that some of the pictures which I have shown tonight were taken from models that were made from modeling compound impressions, but they were taken without the remotest thought of ever making use of them as I have tonight.

I believe most sincerely in plaster as the materials for impressions, for with plaster the most accurate and beautiful set of models for study can be produced. I always construct my appliances upon a model made from a plaster impression, only using compound for something that I consider of less importance.

The beautiful models made by some of Dr. Angle's graduates have been a revelation and inspiration to me, but the time required to make them, and the

difficulty of getting anyone else to do so, is a great drawback to the busy man.

Dr. S. G. PERRY. Dr. Ainsworth in the last of his models showed a most interesting case, but the slide as shown on the screen did not do justice to the case. He has with him the actual appliance that was used, and also a set of models in plaster which show that case far more clearly than it was shown on the screen. It may be too late tonight to show the appliance and the casts, but I hope that some of the members will see how beautifully that case was done, and how original and interesting and effective it was. I regret that Dr. Ainsworth did not dwell longer on the details of that case.

Dr. Walker moved a vote of thanks to the essayist and the gentlemen who took part in the discussion, which was unanimously carried.

Adjourned.

HERBERT L. WHEELER, *Sec'y.*

Monthly Meeting, November 1908.

A REGULAR meeting of the First District Dental Society of the State of New York was held on Tuesday evening, November 10, 1908, at the Academy of Medicine, No. 17 West Forty-third st., New York city.

The president, Dr. J. W. Taylor, occupied the chair, and called the meeting to order.

The Secretary read the minutes of the last meeting, which were approved.

Dr. WALKER, chairman of the Executive Committee, presented a report, in which he stated that it was the desire of the society to increase its membership among the ethical dentists of the city of New York, inasmuch as this is the local branch of the State Society. Dr. Walker also spoke of the work being done in the new Section on Orthodontia

which was recently formed for the members.

INCIDENTS OF OFFICE PRACTICE.

Dr. JAMES F. HASBROUCK. In view of the fact that fatalities under nitrous oxid gas so rarely occur, and that when they do occur the details given out in reference thereto are so meager, I have considered it a duty to this society and to the profession at large to report, as accurately as I can, a case which has recently occurred in my practice.

Dr. Hasbrouck then read the following

REPORT OF A FATALITY UNDER NITROUS OXID ANESTHESIA.

G. Q., male, age fifty-seven, presented for the purpose of having a number of teeth extracted under nitrous oxid anesthesia. The patient gave a history of

having had some slight heart difficulty and some trouble in the throat, not yet diagnosed, which necessitated his eating soft food. On examination no heart lesion was observed, and while the uvula and pharynx were slightly edematous, their appearance would not excite comment. The general appearance of the patient was that of one whose vitality had been considerably impaired.

Nitrous oxid gas was administered and the operation started, and after the removal of a few teeth the gas was readministered; during the operation following the renewal of the gas the patient apparently collapsed. Respiration stopped, and after an hour's work, using artificial respiration and whiskey and strychnin with the hypodermic, to which there was no response whatever, an examination was made with the help of another physician, who had been summoned, and it was decided to give up the patient. Our diagnosis as to the cause of death was asphyxia from acute edema of the larynx during nitrous oxid anesthesia.

Unfortunately no autopsy was held. It will always be a question as to whether the heart or the respiration stopped first. I did not attempt to listen to the patient's heart until after an hour's work with artificial respiration, and all our experience and experiments have shown that the respiration invariably stops before the heart. The patient may have had a chronic endocarditis, and death may have been caused by acute dilatation, which would account for the collapse and lack of response to stimulation. I know that we pumped air into the lungs, because I held the epiglottis up with my finger and could hear the air rush back and forth as the chest was compressed and allowed to expand.

I am advancing these theories, because I am unable to tell with absolute certainty what killed this patient. The case must, of course, go down as a fatality due to nitrous oxid, for had the gas not been administered and had the operation not been performed, the patient would probably be alive today. We are so accustomed to giving nitrous oxid in cases where organic lesions of all kinds exist

that it is considered practically innocuous, and in my office record of more than one hundred and fifty thousand cases this is the first fatality which I am able to report.

Dr. COLDING. I used to give nitrous oxid until I had a peculiar experience. I shall not give the young lady's name; her father was president of one of our Georgia railroads. I administered to her three bagfuls of nitrous oxid, without effect. Her mother laughed and said, "Doctor, you can't get Miss Helen." I answered, "There is some idiosyncrasy here." Some time after she was taken to the Savannah Hospital for a slight operation. She had hardly taken over three to five inhalations before she was dead. She was apparently sound in every respect. Subsequently I abandoned its use in my practice. Some time after her death, her mother was in my office and reminded me of my remark, saying: "Oh, doctor, if we had only taken warning, perhaps she would be with us still!" I told her that that was something no one could foretell.

Prof. EDWIN T. DARBY of Philadelphia then read the paper of the evening, entitled "Would the Medical Degree Add to the Professional and Social Standing of the Dentist?"

[This paper is printed at page 542 of the present issue of the *Cosmos*.]

Discussion.

Dr. S. G. PERRY. Not having had an opportunity of reading Dr. Darby's paper, and having no intimation whatever of its trend, beyond that which would naturally come to me from long and intimate association with him and from such profound admiration of his ability as I have always had since I was a student with him, I feel hardly able to undertake a careful discussion. Moreover, I do not think the paper discussible, because it is so logical and conclusive that there is in it no question to be discussed. Of course, from a man who has spent a quarter of a century or more in teaching in a great university, and who has had opportunity from prac-

tical experience and teaching to note all these things, it would only be expected that he should bring to bear the most convincing conclusions that could be reached by any of us. Dr. Darby is surely as well, if not better, equipped for a paper of this kind than any man I know in the dental profession. A quarter of a century of continuous work of that kind is an achievement that must not be overlooked, and it seems to me that there is no escape from Dr. Darby's final conclusion.

I would not undertake to criticize or discuss critically any single question in the paper. I might take exception to some of the points, but it would be better for me to take the paper as a whole and say that it is unanswerable.

I believe, as far as social relations are concerned, one's position in the outside world depends solely upon the man rather than upon the institution from which he comes, or upon any degree which he holds.

Lincoln said, "You can fool the public for a little while, but you cannot fool it for a long time." The public is unerring in its estimate of men, in my judgment. It can see through you as if you were, not a piece of ordinary window glass, but a piece of fine French plate, and it takes you for what you are—not for what you think you are. That kind of estimate lies at the foundation of many successful practices. I believe that the general manner of a man in his practice, his treatment of patients, the sympathies or the firm convictions he may have, and his opportunities for broadening culture, are the conditions that count for almost as much as the professional training he may have had.

The public judges a man by those conditions. It really cannot judge him by his professional attainments. A man's professional brethren may estimate his professional attainments, but the public is not in a position to judge so knowingly, so that the public's estimate of a man falls outside of real professional attainments. The refining influences that are brought to bear upon us in our professional work from day to day are very

potent. There is no calling on earth that is more conducive to culture. We are called to attend to the health of people of all ages. We see them at their best, and are not depressed by the dreadful conditions of fatal disease, so that we are not led to take a depressing view of human life. We live more in the sunshine, and we have social enjoyment with our patients. We are glad to see them, glad to see the little children come in smiling, as well as persons of old age, so that the dental office for the most part becomes a kind of school, which is unlike any other school that can be named—a school of practical experience. We get perhaps a more refined experience than that of the average physician or average surgeon. If I were a physician I think I should be overcome with discouragement over the dreadful things physicians have to see. If I were a surgeon, I could not have the steadiness of hand to do what they must do.

The demands made upon us have been such as to call into play the use of our hands more than that of our brains. Many men have been eminent as operators because of their being so skilful with their fingers and not because of any special individual qualities, with perhaps very narrow culture—not the culture that comes from contact with educated men and women.

In that respect our profession must always be a little different from those of medicine and surgery, because the conditions are peculiar.

As to the influence of graduating in medicine and holding a degree, I do not quite agree with Dr. Darby in regard to one conclusion—that the public does not quite know and does not quite care whether the dentist has a degree or not. I think the public at large, although this statement seems to be paradoxical to the thought to which I have just given expression, the unthinking public places a higher estimate on a high degree, and a man from the University of Pennsylvania can go anywhere and command respect. I think the medical degree is worth striving for. If I had a youngster, I should start him—if he were to be-

come a successor of mine and expected to practice my profession—with a thorough education in the English branches, the fundamental and auxiliary branches. I should include those in the beginning, and should see that he had an early enough opportunity to be benefited by them; then I should have him acquire a degree in medicine, feeling that during the four years which he devoted to that purpose he would be learning not only medicine, but various other things—he would be growing into the habit of careful thought, and under the training of trained men he would be forming a habit of correct observation that would well pay him for the work of those four years, because of that very application of habit and thought.

This would be like sending a boy who wishes to pursue a non-professional career to one of the great universities. If I had a boy who wanted to take up a commercial career or any special work among the activities of the world, I should feel inclined to send him to Yale or to Harvard, because of the broadening influences which those four years must exert, although I realize that some of the influences may be perverting. I have a nephew who made acquaintances at college that resulted in lasting friendships for life, and who found himself under influences that he could not have been put under in any other way. It seemed sometimes like a waste of effort and yet upon close observation and thought it was not. Those were the most valuable four years of his life, and laid the foundation of a broad and liberal education for his future in the commercial life.

In the same way the time spent in taking the medical degree would be well spent, although after finishing, the graduate would not be in any better shape for beginning his profession of dentistry; he would have to exercise his hands and to train his mind through his hands, and do work from instinct and intuition as well as from direct training. One has sometimes to be on two sides of a question. I do not understand how it is possible to escape the conclusion that

there must be an advantage in taking the degree in medicine.

Now, as to the advantage from the professional standpoint. Say what we will in depreciating it, dentistry is one of the most noble and altogether respectable professions that has ever been evolved by man in his efforts toward a higher state. I would not put any other profession before it, not even that of the ministry. If a young man could take up the study of dentistry after he is fitted to begin a regular medical practice in a general way, he would be better equipped for dental studies than if he had not taken the medical degree. He would command the respect of medical men to a greater extent, and would stand better before the community at large.

Many of my remarks seem contradictory, and even my slight criticism of Dr. Darby's paper will perhaps not bear analysis. I would rather believe in the essayist than in myself. I know him better than he knows himself, and have not only the greatest admiration for him, but also the greatest love.

[Turning to Dr. Darby.] I not only love you because of the qualities of your heart, but also for that sterling quality which you possess of good New England common sense.

Dr. A. L. SWIFT. I have listened with the deepest interest and profit to this most able paper of Professor Darby. Like Dr. Perry, I have not had the pleasure of reading the paper. The chairman of your Executive Committee requested me some few days ago to simply express a few of my ideas on this subject, and to save time I have written down the few ideas I think important enough to read.

I believe that the medical degree would add to the professional standing of the dentist on the general ground that a dentist who has earned the medical degree will always be looked upon by patients and the community as one who possesses a more profound knowledge of the human system. This broader knowledge will be considered to better qualify him for the diagnosis and treatment of serious and complicated cases.

Looking at the question from the den-

tist's viewpoint, the possession of the medical degree by a dentist would in no way insure that he had attained the technique and experience which would constitute a good operator. Still, since dentistry is a collateral branch of the healing art, would we not as practitioners be considered better equipped by the acquirement of that general knowledge which the earning of the medical degree should give one? Not that this knowledge should be employed by the dentist in directions which would conflict in any unethical manner with the family physician, but the fact that the dentist possessed the medical knowledge would give his opinion greater weight in the minds of his patients, more particularly in complicated cases. I do not doubt that this increased knowledge would be of great advantage to any practitioner.

Aside from the question of professional standing, I have always felt the need of that broader knowledge and have regretted that I do not possess it.

Most of us, I think, have been confronted with our lack of medical knowledge in complicated cases, as we have also been confounded by the ignorance displayed by illustrious medical men who were totally incompetent in consequence of their absolute ignorance of the dental side of certain cases. In such cases a good practical dentist possessing a thorough medical knowledge would have a decided advantage over one who did not, and also over the physician; many unnecessary operations would thus be avoided, and the patient would receive infinitely better service.

If I were beginning my dental education tomorrow with my present knowledge of its requirements, I should most certainly aim for the medical degree, not alone on account of the professional standing which it imparts, but principally on account of the wider scope of learning, which I consider would be of vast importance, particularly if one should wish to undertake scientific research work.

Dr. C. S. STOCKTON. The gentlemen who have discussed the paper of Dr. Darby have evidently been notified to do

so. I was simply requested when I came into the room to say a few words. Before I enter upon the subject, let me say, my dear Dr. Perry, that you have not a monopoly on the love for Dr. Darby. A good many of the rest of us share that love—I doubt whether any other man would have brought me from New Jersey tonight—but I will not tell you about that now; I am going to reserve that for the 16th of January, when we give the dinner to Dr. Darby.

Many of you complain, perhaps, at not receiving the recognition that you think you are entitled to because you are dentists. Much of that feeling grows out of tradition handed down from years gone by. I remember very well in my early days that men drifted into dentistry because they were good mechanics or good jewelers. I have in mind a man who graduated from the blacksmith's shop to dentistry, and hung out his sign as "Jacob Phillips, dentist." He was a blacksmith for thirty-five years, and thought, because of his ability to weld iron, he could pull teeth out and put teeth in. From such and similar conditions a prejudice has arisen in the minds of the people against the standing of dentistry as a profession. They never thought of Jacob Phillips as a professional man, and that view has come down, prejudicing the community against dentists as a professional body. But how different conditions are today from what they were fifty or sixty years ago! Then the Jacob Phillipses could cease using the anvil or welding the iron, and hang out a dentist's sign on the doorpost or the window sill, and people would go to them. They had a certain following—their personality, perhaps, brought it. Today that is impossible; we are more entitled to recognition because of the knowledge required to practice our calling.

Think for a moment what it is to become a dentist today. You must have the knowledge that a graduate of the high school possesses before you can enter the college door. You must pass three years of time in the college, and then come before an examining board,

whose questions are such that it is a wonder to me, not that fifty per cent. of the product of the colleges has been turned down, as has been the case lately in New Jersey, and perhaps in some other states, but that more of them are not turned down. The examining boards of today are taking a higher stand and making better dentists of those who enter our ranks, and we are therefore more justly entitled to the recognition we all desire, and there is no reason why any young man fulfilling the requirements for entering our profession should not receive the professional recognition that is due to any professional man.

I would combine, as Dr. Perry has intimated, the D.D.S. and the M.D. It would be of great advantage if we could do this. Our colleges and our examining boards are gradually rendering the position of the young man who enters dentistry fully equal to that of the medical man. As you look over the list of studies you will find very little difference between the two departments, excepting the practice of medicine and gynecology, whose place is taken by other studies in the dental course. The course of study today of the dental student is almost equal to that of the medical man. I hope to see the day when you will be recognized as you think you ought to be, but that will never be until you do just what Dr. Darby has said and Dr. Perry has emphasized. It depends not so much on what degree or how many degrees you have; in the community in which you live you will be recognized as the man you are. You may have ever so skilful a hand or trained intellect, but if your moral life in the community is not such as to commend you, you will be wanting, and be found wanting by that community. The people know what they want, and they are going to have it, a fact which we have just had demonstrated in our election. The people know what they want, and you cannot long fool them.

If you have the right view of life you will be successful. Your time for study and education is before you are thrown into the vortex of business. If that period is allowed to pass, and you enter

the profession without it, the recognition you expect will be withheld. The uneducated man and dentist goes out into the world, and finds himself alone. If such men go out into the world and are not recognized, it is their own fault.

The great want of the dental profession today is a higher education of those about to enter its doors.

Dr. WILLIAM JARVIE. It gives me a great deal of pleasure to meet with this society again after an absence of some months, more especially as my friend Dr. Darby is with us. An evening with him is like a benediction—I always feel so much better for it. A paper like the one which he has presented tonight is just what you might expect from a man who has spent the greater part of his life in teaching young men not only how to enter but how to carry on the practice of dentistry, and he is certainly eminently fitted to present the question.

The discussion has taken perhaps a wider range than the title of the paper would indicate—a greater range in the direction of what course would best fit the dentist for practicing his profession. The title of the paper is “Would the Medical Degree Add to the Professional and Social Standing of the Dentist?”

I have always felt that any degree a man may have is an indication that he must have done what was necessary to procure that degree. The medical degree signifies most positively that its holder has had a thorough medical education, and that of course is not what the D.D.S. alone indicates. The M.D. shows something more, and the first impression of the public would naturally be that the man who has an M.D. degree has an education such as the man who has only the degree of D.D.S. does not have.

It requires a higher preliminary education to enter the medical school than to enter the dental school. At present it requires four years' study in the medical school to obtain the degree, and only three years in the dental school, and to that extent I think the M.D. has a better standing in the community than one having only the degree of D.D.S. I might

qualify that and say that the profession of medicine has a higher standing in the community than that of dentistry, and I would reiterate what has been said by the gentlemen who preceded me in regard to the standing of the individual, namely, that it depends entirely upon that individual, upon what his attainments are, and what qualification he may possess, and upon his general character and conduct.

When I retired from dentistry some two years ago, I received a large number of letters from my old-time patients, most of them regretting that I was retiring from practice, some of them objecting most seriously to it, and many requesting that I might continue with a few patients. In all my experience I have never felt nor been made to feel in the least degree that I was at a disadvantage socially on account of being a dentist rather than a physician.

I would say again that the dental profession is made up of units; the unit is each man that is practicing, and the profession as a whole is just what each man as an individual helps to make it. As we advance individually in culture, in education, in refinement, and good conduct, so the dental profession as a whole will be lifted as high as any profession can be, or as any number of men in any community can be. There is no reason why dentistry should not stand equal with law, or medicine, or divinity. The dental profession is young, but it is advancing rapidly. In 1895, I think, I received the greatest shock professionally that I ever felt in my life. It was upon receiving the examination papers of perhaps one hundred graduates in dentistry. I did not suppose that it was possible for men such as had written those papers to be graduated from any school where any intelligence was required. The papers showed a lack of intelligence and a lack of education, so much so that it was absolutely necessary to turn down sixty per cent. of those men, although the examining board in this state wanted to be as lenient as possible. It was the first year in which the law in this state was put in

operation, and not wishing to educe any further opposition, we made the examination as easy as possible; yet it was necessary to turn down about sixty per cent. of those men. That was only thirteen years ago. I have been off the board three or four years, but the change since then has been simply marvelous, so that perhaps not more than four or five per cent. in some of the examinations failed. The character of the men and their educational acquirements have changed absolutely. I only mention that to give encouragement as to the progress that is being made in the educational condition of the men entering the profession.

Quite a little has been said as to what is best for the dentist in regard to education. I do not know whether we have arrived yet at the very best curriculum to turn out the best dentists, whether the dentist should be expected or required to go through a medical curriculum, and afterward a dental one, or whether there should not be a combination of the two, so arranged that it shall not take six years of a man's time after entering the medical school before he could expect to support himself. Could there not be a curriculum arranged so that in four years a man should have all the knowledge of medicine that would be required to practice dentistry intelligently, and yet have a fair time for the practice as well as the study of dentistry, before he is turned loose upon the community?

I cannot help but believe that ultimately that will be the result, and it will mean that the plain simple dental school will either have to close its doors or connect itself with some university where the number of professors is so large and the outfit is of such a character that an education of that kind can be given. It is offered now at some of the universities, but in general I think we will have to modify the curriculum in order to obtain an ideal course of instruction for dentists.

Dr. M. L. RHEIN. I feel rather peculiar this evening, inasmuch as in coming here I did not expect that our dear friend, Professor Darby, was going to take the article which I presented this

summer before the American Medical Association as a sort of text for the paper he read to us tonight.

After listening to the discussion of the men who preceded me, I feel that each one of them in turn echoed practically the sentiments that are expressed in the paper, and that they all seemed to feel that this was demanded of them on account of their deep affection for the essayist of the evening, although they occupy an implacable position on the opposite side of the question which he has presented to us. It is somewhat amusing to listen to the discussion which purports to be in accord with the paper, and yet each speaker has taken an absolutely opposite standpoint. I know that it is hard to disagree with anything Professor Darby might say. It is always difficult to disagree with our friends on any question, and I want to confine myself pertinently to two or three of the points that the essayist brought up, and which I think are germane to the question.

In the first place, I do not think the question of the degree as a degree should have any bearing upon the subject at all. The degree is simply something that an individual has earned after having passed an examination to testify that he has a certain knowledge on certain subjects, and has reached the stage when the faculty under which he has studied believe him to possess that knowledge.

In the years of my practice I have come in close contact with many members of the dental profession who have not had the degree of M.D., but who have acquired this self-same knowledge, oftentimes at a much greater cost, as far as labor is concerned, than if they had acquired it at an institution. This makes no difference in the individual standing or ability of these men as compared with those who have the degree, and I wish to emphasize the point that it is the knowledge that is supposed to go with the degree of M.D. that we ought to consider.

I think too much stress is being placed upon the question of personal standing as far as the relationship of the dentist

to the public at large is concerned. I thoroughly agree with everything that has been said, that this relationship rests with the individual; but the individual is not a lawyer nor a medical man nor a dentist because of that position, or because he is liked for his social qualities, or because he has a fine singing voice, or other qualities that may endear him socially. He is made much of as a professional man and is much thought of, by the evidence of his skill and ability as a professional man, and in no other way can he leave any enduring mark as a professional man. Other attributes may add to his status as a man, but his professional ability is the one thing that will be considered by the public that goes to him, and to whom he caters.

There has been a tendency in the discussion to underestimate the value of dentistry, and against that tendency I desire to raise my voice. I do not believe that the man who uses his best endeavors to alleviate the dying moments of an individual, to make his last illness less painful, is as great an ally to the advancement of the health or the evolution of the human race as that specialist in medicine who uses his energy and his ability to keep healthy the human body; in other words, to defend the human body against the attacks of disease, which is the province of the dentist. No greater one exists among all the specialists of medicine. We may listen until doomsday to arguments that we are not practicing a specialty of medicine, and yet we are simply grasping or running after an *ignis fatuus*. How is it possible to practice on a part of the body and ignore the whole? We know that the practice of medicine covers the entire range of the human economy, and we are devoting our attention to one portion of it. Does it require one moment's argument to think or to say that a broad knowledge of that entire human economy is an aid to the man who devotes his lifetime to a part of the human economy? If he acquires that knowledge his position must be better, inasmuch as he is better able to give his services intelligently. In that

respect I protest against undervaluing our position as it should be and as it will be in the future.

The essayist made the assertion that if such a condition as I advocated in my paper existed it would debar from entrance to the college many men who now enter. I can only say, Debar those men, then, because they are the members of the freshman class that should have been turned away. Those are the men whom we do not want in dentistry. In other words, if we were to put ourselves on the plane on which, as I have so often maintained, we ought to stand rightfully—the peers of any medical men—then those who enter dental colleges would not be men who enter because their qualifications will not admit them to the medical colleges. They would be of the same quality and of the same high grade, and unless we raise the status of dentistry to that high position, we do just what Professor Darby said tonight—we open our doors to men whom the medical colleges refuse to educate; and that is exactly where our great fault lies today. [Applause.]

Professor Darby mentioned in criticism my remark about a twelve months' curriculum in the effort to give this knowledge in the regular curriculum of the dentist of the future. I am glad that he brought up that question, because I consider the fact that the colleges, dental and medical, close their doors against the student for four or five or say only three months in the year, is one of the greatest crimes in educational matters that exists at the present day. It is all right for the young boy, before he reaches the age of professional education, to have a summer vacation of that duration. Stop and think for a moment of the young man who has passed through high school or college and goes out into the commercial world, or into any other station of life in which he is commencing to educate himself for his future career. Does he have a four or five months' vacation? The idea of four or five months' vacations was never meant for the benefit of the student. That is the first great error. It has been established be-

cause it is a physical impossibility for a teacher to teach twelve months in the year, and consequently the student has to lie idle all the balance of that time, at an age when it is not necessary, when in no other career is he idle for that length of time; for that reason I say that this regulation in the education of the young man who has finished his fundamental education is a crime against him. We speak about taking too much time to educate a dentist, and yet we cut out a quarter of each year of his educational period. We do it because no teacher can stand the strain of teaching twelve months in the year. Knowing that, we should find a solution of this problem from a different standpoint, and it is in reference to that solution that I presented the paper in question. There are two different ways of solving that problem. The simplest is that there should be two professors for the same position in the colleges. This is not a new problem. The same problem confronted every hospital in the United States, and this is how it was met: The surgeon, when he reached a position of prominence, was envious and wanted to hold it, but he could not do so because his physical condition would not permit it, and as a result he leaves duty at a certain time, and another man takes his place. This is one way of solving the problem in professional education.

Present conditions are favorable enough for a truly medical education, but my suggestion was that, utilizing this idea, the medical and dental education could be combined and keep the student busy during the whole twelve months of the year. We know perfectly well that a large proportion of the students after they leave school at vacation time do not really take a vacation. A large number of them go to work; in fact the argument has been urged against the propriety of the proposition that I advocated that it would prevent a large number of those young men from following out their course because of their inability to pay their tuition—that they earn this tuition by going to work in the interval.

Professor Darby made the remark that, after all, it is skilfulness on the part of

the dentist for which the public is looking; that it is not so much respect, or anything else, but that his skill is the achievement the dentist is most proud of. There are two points in this remark that I wish to take up. In the first place, it is my belief and the belief of a great many men who have been in practice as long or longer than I, that the student as he is turned out today from the dental college has not the skill that the student possessed who left the college twenty-five or thirty years ago; in other words, that the abolition of the preceptor system has reduced the ability of the graduating student to an enormous extent.

Granted that the ability to work in the infirmary and the laboratory gives the student a degree of manipulative skill that is very great, of what benefit is that skill if it be misapplied? Give me two men; the one may have the greatest amount of technical skill possible in a given case, but if his diagnosis of that case is wrong, his technical skill avails him naught, and the other man, who may make a correct diagnosis and have less technical skill, may do much greater service to the patient.

This is the keynote of the value of the knowledge of medicine to the dentist, that nothing else will enable him to become a correct diagnostician.

Dr. SCHAMBERG. I am more than proud of my dear teacher, Dr. Darby, for whom we all have the greatest love and respect. We all realize that many of the points he has brought up are points of practical difficulty, and that is the greatest barrier to the change; but there are very few men present who do not realize that the profession would be materially benefited by the acquisition of the medical instruction—let us not say the degree, because the degree, as has been pointed out to you, means little.

Working in a field that is on the border-line between the two professions, I hear criticisms by medical men of the family dentist who probably temporized with a surgical condition far too long, and criticisms from the dentist to the effect that the physician was looking too long on a condition that was purely dental, and

could be relieved by dental means. Such conditions would not exist if the dentist acquired his education in the same way as the medical man. A point brought out by Professor Darby, which I wish to emphasize and with which I agree, is that there is very little difference between the practice of ophthalmology, as a specialty in medicine, and dentistry, except that dentistry started in wrongly. Yet our starting wrong is no reason why we should continue wrong. The rhinologist in working on the nose requires considerable manual skill, and I dare say it requires just as much skill to remove a spur from the nose or to remove a submucous section as it does to do anything in dentistry.

Another point which I think is an important factor if this coalition ever takes place is the possibility for a man to practice that specialty which he loves. Many men who graduate in dentistry really should never have done so. Look what a horrible practitioner would have been thrust on you if I had not taken the medical degree, because I know how poor my purely dental work is (Dr. Rhein and some others who have seen it will agree with me). But I had an opportunity to practice that work which I like, and in the same manner the profession would benefit by some of the men drifting into specialties, owing to the fact that they were qualified to do so.

Great stress has been laid upon the long and arduous course that would be required. Many of the men referred to their personal experience, and I perhaps may be permitted to refer to my own.

I was graduated in dentistry when I was twenty-one years old. I combined my two courses and acquired my medical degree when I was twenty-three. My only regret is that I did not take up medicine first, and did not take it up even more thoroughly than I have done. I do not believe that I lost much time. After being graduated, I spent one year in the army as surgeon, and I only gained by that experience. The same is true of the medical interne who spends a year or eighteen months acquiring knowledge in the hospital. That will always make it

possible for him to build up a practice a little more rapidly than he could do otherwise. I do not think a man who goes through his early training hurriedly will benefit much by it.

In regard to the difficulties that confront us, I admit that we should have many to overcome in connection with this change, and some of them may appear so great that to some people they seem insurmountable. Being connected with a dental school, I find that there are many practical points that would almost render that change impossible now, but we must look forward to something that will render it possible in the future. I think a school founded here in New York city and organized on the lines suggested by Dr. Rhein would be a big success. It would be a step forward, and the gentlemen who discussed the paper tonight would surely give their moral support to such a movement. Owing to the difference between my views and those of Professor Darby, I do not wish to appear to in any sense pass a reflection on him. We all know what an inspiration he has been to any man who has been graduated from the University of Pennsylvania. I do not think there is anyone whom I revere more. I may not have been as demonstrative as some of his other children, but I take great pleasure in saying that I feel just as much love for him as they all do.

Dr. MILLS. I came especially to pay my regards to Dr. Darby. He has as warm a place in my heart as anyone, although a great many hold a warm place there.

Dr. Rhein so seldom gets rid of Dr. Rhein in speaking that I really appreciate what he said tonight. I have heard him when he was all Dr. Rhein. What he said tonight is clear good common sense, and I applauded him on this one thought. When he drew the line between the physician and the dentist he did not mean to say that we discredit the physician for all he is, and for the good he bestows on the human race. Physicians have their place, and it is a holy one, but I do believe with all the experience that has come to me after

seventy-seven years of life, fifty-six years of it in the practice of dentistry, that the greatest amount of good can be bestowed by the intelligent dentist toward preventing disease to which people fall victims, whom the doctors have to take care of afterward.

I believe that the day is approaching when we must make an advance on the lines of dental education. You know how I have emphasized prevention in dentistry. Some people think that I have been talking too much of Dr. Smith. I admire him, and we cannot commend him too much, but there is a field outside of that which lies far beyond the powers of any individual man. I am thinking of the larger sphere as outlined by men like Dr. Talbot and Dr. Kirk, and other such men who are springing up all over the world, advocating a greater advance in dentistry.

I have the greatest admiration for what the men who discussed the paper tonight have said, and I have been line in line for years with Dr. Perry and Dr. Jarvie and such men as Atkinson, McQuillen, Watt, and other distinguished practitioners throughout this country and abroad. We have much to be thankful for that we have been in the line of a noble heritage. This will accrue to the benefit of the coming generation, and in whatever I have to say I wish to leave something on record for the benefit of the men coming after me.

My day is over, comparatively speaking, but I am not done thinking. While I cannot do with my hands what I used to do, I am still alive in my thoughts, and I wish to say with all my heart that the time is fast approaching when the young men who start in dentistry must pursue a course of study far beyond anything we think of today. We cannot speak too much of what we have already acquired.

Dr. Rhein said you may have all the technical skill in the world, and if you fail in diagnosis, you fail as a practical man. The strongest men in our profession have come out as diagnosticians. Do not let the thought enter our minds that nothing has been accomplished, and that

we have no good dentists. I admire the skill which I see today being displayed by young men in filling teeth, which, a few of the older men excepted, is far beyond anything we ever saw in our earlier days.

There is a great lack of correct diagnosis and fine perception in our profession, and we must make up for that shortcoming. It is altogether the man behind the instrument who distinguishes himself, and as the essayist said, while we may do all we can in raising the status of dentistry, it must always lie with the individual. While I deplore the indication of a decadence along certain lines, as shown by the advertisements in the streets and cars, I feel that there never was a time when there was a greater aspiration toward higher conditions than today.

Dr. DARBY (closing the discussion). Did time permit, I should like to talk on this subject at considerable length, because many good points have been made. I hope that I have not seemed to underestimate the value of a medical education. It certainly was not my intention to do so, for I myself strove to get the medical degree, although I admit that in the end it was conferred upon me!

While I would not undervalue a medical education, I would not place too high a value on that degree for the dentist. I make that distinction between the education and the degree. Many things that are possible may not be practicable. I said it was hardly practicable for the dentist to take a full medical course, spending, as he must, three or four years, after having had a course of three years in a dental school. I believe it will be but a short time before the better medical schools, especially those connected with universities, will demand a five years' course. They are now demanding the degree in Arts and Science. The student of dentistry has the same instruction and passes the same examinations in anatomy, physiology, chemistry, bacteriology, and histology as the medical men. He does not get the practice of medicine, or bedside instruction, or general surgery, but he gets oral surgery, and ought to know

and does know more of oral surgery than the general medical student. He acquires a good practical education without the medical degree.

Now the question arises: Is it worth what it costs in time and money to acquire the medical education and the medical degree, if he is going to practice dentistry? For my own part I wish every student of dentistry could have the medical education, but as I said before, things that are possible are not always practicable, and I question whether it is wise for the dentist, in all instances, to be graduated in medicine.

I agree with Dr. Rhein in a great deal that he has said, but I do not agree with him that a student should spend twelve months of each year in study. There are very few constitutions that would stand it—especially is this true in our climate or in the southern states. A student needs weeks or months for recreation. Our students at the end of a college course of eight or nine months are pretty well used up. They must have time for recuperation, and what they do get in the summer builds them up for the following winter's work.

I did not intend to disparage in the slightest degree the medical education or the medical degree. Dr. Schamberg knows that. He is practicing oral surgery, and oral surgery is surgery, and no man should practice oral surgery unless he has a medical degree.

I thank those of you who have spoken for dealing so leniently with my paper. I did not expect you to do so, and I did not want you to do so; I wished you to say just what you thought, and I think you have done it, and I thank you for it.

Dr. WALKER. I move that a hearty vote of thanks be tendered to Professor Darby for his interesting paper.

Motion carried.

Dr. WALKER. I move that honorary certificates be prepared for the two honorary members who were elected tonight—Dr. Ainsworth of Boston, and Dr. Pullen of Buffalo.

The motion was carried.

Adjournment.

HERBERT L. WHEELER, *Sec'y.*

NORTHEASTERN DENTAL ASSOCIATION.

Fourteenth Annual Convention.

(Continued from page 480.)

WEDNESDAY—*Evening Session.*

The meeting was called to order by the president, Dr. Griffith, at 8.30 o'clock Wednesday evening, October 21, 1908.

The first order of business for the evening session as announced by the president was the reading of a paper by Dr. RICHARD GRADY, Annapolis, Md., entitled "The Dentist in the United States Navy: An Account of the Efforts to Secure a Dental Corps," as follows:

THE DENTIST IN THE UNITED STATES
NAVY: AN ACCOUNT OF THE EFFORTS
TO SECURE A DENTAL CORPS.

I am gratified and honored by your welcome and the pleasing task which your favor has imposed upon me. I feel something like counsel for the plaintiff with nobody on the other side, as it is manifest, I take it, that we are all agreed upon the necessity of providing the navy with competent dental surgeons. It would be absurd, it would be impertinent, in such an assemblage as this, composed of the highly intelligent in civil practice, if I were to attempt to show the abstract advantages of the army and navy dentist.

It is difficult for a man to speak about himself or his work, but perhaps, in this meeting, I may without impropriety say some words in reference to one incident in connection with the bill to reorganize the corps of dental surgeons attached to the medical department of the army, which promptly passed the Senate and is now awaiting consideration by the military committee of the House.

When Senator Bulkeley made the report of the Committee on Military Af-

fairs to the United States Senate last January, it concluded with this tribute to our profession, on which I cannot help offering a word of joyful notice:

While the military committee, in recommending the passage of the bill, have been guided by a purpose to meet an urgent need of the army on sound business principles, it is nevertheless gratifying to your committee to incidentally accord a small measure of recognition to a profession whose members have contributed much to the public weal and to suffering mankind everywhere.

As one of the profession, I beg to tender to Senator Bulkeley my best thanks for what he has done and is doing, for lending the powerful aid of his presence, his influence, and his personal character to the very deserving cause—dental legislation for the army and navy.

In the navy there is no such grade as "dentist," as there is no authority of law under which such an appointment can be made except for service at the U. S. Naval Academy. The Bureau of Medicine and Surgery has been forced to the unsatisfactory expedient of utilizing hospital stewards and hospital apprentices possessing dental ability. Not only is the system ineffective in accomplishing results and in meeting legitimate responsibilities, but such competent men as alone suffice to undertake the dental work of the service are not willing to remain in this anomalous position; nor is it just that they should be asked to serve in positions which are not commensurate with the standing of their profession.

The need of dental service in the army and navy was first urged by dental or-

ganizations fully fifty years ago in resolutions adopted and committees appointed to memorialize Congress by the Western Dental Association at Quincy, Ill., and the American Dental Convention at Cincinnati, Ohio; and it is gratifying to know that Dr. H. J. McKellops, who proposed the resolutions in July and August 1858, lived to see the accomplishment of his wise suggestion, in part, in February 1901, after a lapse of forty-two years.

The importance of the subject, however, had been advocated by Dr. Edward Maynard of Washington, D. C., the dentist and inventor, as early as 1844, and had so impressed President Fillmore in its favor that he brought it before his cabinet. The Secretaries of War and the Navy took some action, but without result. Later Mr. Davis, when Secretary of War, received the proposition as one having great value, and Mr. Dobbin, Secretary of the Navy, also heartily approved, and expressed himself as under deep obligations to Dr. Maynard for bringing to his notice a project which his own sufferings from his teeth and the benefit derived from their proper surgical treatment convinced him was a most humane suggestion.

No official action, however, was taken, the time not being favorable. There was pending before Congress a bill affecting the corps of surgeons of the army, and it was thought best not to propose anything that might defeat that bill. The difficulties which attended the first efforts at legislation hampered in like manner, this year, the reorganization of the corps of dental surgeons attached to the medical department of the army—"The medical bill would have a better chance without including the dental corps in it."

It was probably the military experience of Dr. Maynard, who had been a cadet at West Point, of Dr. McKellops, who commanded riflemen in the Mexican war, and of Dr. Truman W. Brophy, who served as an officer in the Illinois National Guard, and who has won an honored place for our calling in practical surgery, which led them to observe the necessity for the employment of dentists

in the army and navy, and which prompted Dr. Brophy last year at the American Medical Association to have the section on Stomatology adopt a resolution "that dental surgeons ought to be appointed to serve the officers and enlisted men of the navy and marine corps."

Previous to the Spanish war a dentist had been appointed to the U. S. Naval Academy who was given the rank of acting assistant surgeon in 1873 and honorably discharged in 1879, continuing as civilian dentist until his resignation in 1899, after forty-four years' continuous service and about a year before his death, aged sixty-six. In 1857 a hospital steward of the U. S. army was assigned to duty for dental work at the U. S. Military Academy, and in 1885 he was placed on the retired list of the army, but continued under special arrangement to practice dentistry among the officers and cadets of that institution until a short time before his death in his seventy-first year.

It is difficult to state with precision at whose suggestion the initial steps were taken which culminated in legislation creating a dental corps in connection with the U. S. army service. At the first meeting of the section on Oral and Dental Surgery of the American Medical Association in 1882, a paper was presented on the importance of having dental practitioners for both the army and navy service, and in that section (Stomatology) later, the question was asked: "But if they are not fully educated and graduated M.D.'s, can they rank as regular members of the army and medical corps, or will they be ranked as artisans? These same questions were raised recently on a proposition to appoint a dentist on the staff of one of the London hospitals." As Dr. J. A. Libbey of Pittsburg once said, "Those who employ their services in these days have a right to look, and do look, to the qualities of the mind as well as mechanical adroitness of the fingers. . . . The stomatologist will take the degree M.D., leaving the name 'dentist' to designate those only who do mechanical work."

In 1898, when the National Associa-

tion of Dental Examiners met in Washington, D. C., I prepared two resolutions signed by Dr. T. S. Waters of Baltimore and myself for adoption, one looking to the unification of state dental legislation and the other to the appointment of dentists in the U. S. army and navy.

To show the position assumed at that time (when I had not the slightest expectation of becoming dentist at the U. S. Naval Academy) the latter is quoted:

Whereas, Congress adjourned without action on the bill introduced (May 27, 1898) to establish a branch of the Medical Department, to be known as the Dental Corps; therefore be it

RESOLVED, (1) That it is the sense of this meeting that the matter should be taken up again, with the hope that another effort will result successfully, and that the dentists of the country, by letters, and the organized societies, by resolutions, should give evidence to their representatives in Congress that they do sincerely desire such a law.

RESOLVED, (2) That a committee of five be appointed to inaugurate steps looking to the speedy action of all dental organizations, cordially indorsing the employment of qualified dental surgeons in the army and navy.

RESOLVED, (3) That this meeting notes with pleasure that while various attempts were made throughout the country, notably by the Missouri State Dental Association (which was the first to indorse the bill referred to) and the Chicago Dental Society, the issue was brought to a practical and successful result, at least so far as the forces now in the Philippines are concerned, by the appointment of a graduate of the dental department of the University of California and two assistants to serve with General Merritt's army.

Sooner or later positive action must be taken by Congress on the question of dentists in the navy. The navy is bound to develop, and with this further evolution must come the substantial benefits of intelligent dental treatment to all the *personnel* of the service, the recognition of the time and money spent in acquiring a professional education, and the position officially and socially which self-respect approves. Congress has already recog-

nized the value and need of dental services in the army by providing for thirty-one contract dental surgeons and appropriating \$57,960 a year for their salaries, the addition to the thirty heretofore authorized being for the U. S. Military Academy. I shall give in this paper the substance of the latest discussion of the question of dental surgeons for the navy in the House of Representatives, from a point of view not our own, quoting from the *Congressional Record* what I venture to say is known to few dentists. It shows how the question is viewed by members of Congress when called upon to act.

The canny Scot, while wishing for the power to see ourselves as others see us, might wisely have wished also that we might see others as they see themselves—the other fellow's point of view—the standpoint of a legislator as told by our generous friend, Senator Bulkeley:

The points considered are:

1. The appointment of dental surgeons should be for a term of years and revocable at the pleasure of the President.

2. If we are to have dental surgeons as officers in the navy they will have to go on the retired list and be appointed for life the same as other officers.

3. In reference to the desirability of having dental surgeons in the navy, certainly some provision ought to be made for them.

4. Does the Committee on Naval Affairs believe that it can create any commissioned officers in the navy who will not be appointed for life and put on the retired list within a very short time by law?

5. The bill does not create a dental corps; it simply hires a number of men, dentists of good standing, who shall have the rank of assistant surgeons, the right to discharge them at will being left to the President.

6. The committee in providing for dental surgeons discriminates against them. An assistant surgeon of the navy must be appointed by the President and confirmed by the Senate. Now it is proposed to give the same rank to a dental surgeon, but his appointment is not confirmed by the Senate; he is appointed for a term of years—no one knows whether it be for one year or fifty years—but at the pleasure of the President. Certainly, if we are going to provide these surgeons in the navy we ought to provide

them on exactly the same basis as other assistant surgeons.

7. An assistant surgeon is a commissioned officer.

8. The navy probably needs dental surgeons as much as the army, and it has worked admirably in the army. Providing dental surgeons in the navy ought to be on the same basis as the dental surgeons in the army. The army has no commissioned dental surgeons; they are contract dental surgeons. This bill proposes that they shall have the rank of assistant surgeons, revocable at the pleasure of the President. That changes the law and would get rid of an officer without a court-martial. The President, unless some charge was made against a man, would undoubtedly leave the assistant surgeon in until the time of retiring and retire him with rank and pay of assistant surgeon.

9. Both arms of the service should be alike, so that we shall not be constantly hammered to raise one to the level of the other.

10. Have contract dental surgeons until the time comes when we can report a bill outside an appropriation bill to deal with this question as it should be, and put these men on the basis they are entitled to have in accordance with the dignity of their profession.

11. If he is a contract dental surgeon the department would have the right to remove him without going to the President. The chief medical officer is the proper one, if he is to be removed for incompetency.

12. The government ought to provide for the needs of the navy along this line. Do not favor any provision that authorizes the President or any other officer arbitrarily to remove any officer at his pleasure. The tendency of that system is to make flunkies and sycophants of every man in the service subject to that power.

13. Clearly the intention is to make them contract dental surgeons. The army dental surgeon is a contract dental surgeon.

14. The army contract does not run for any definite time. The medical department of the army has charge of that. It would be better to put the power of removal in the medical department of the navy.

15. Strike out the word "rank," and provide for the pay of an assistant surgeon of the navy, then make him subject to removal by the Surgeon-general of the navy, and all will be accomplished that can be in this bill of putting the two arms of the service on exact equality.

16. You could not secure competent den-

tal surgeons to go away and remain for a cruise of a number of years. You would cripple the efficiency of this proposition if you made it impossible to get dental surgeons who could remain away for a term of years, which you could not do if you should merely make them contract surgeons.

17. The dental surgeon of the army, when he makes the contract, surrenders his practice absolutely. He goes to Alaska, to the Philippine Islands, or to Cuba if his regiment is there. He is employed simply as a contract surgeon without any term of years. If he is competent he will stay as long as he is able to do his work.

18. What class of men are obtained in the army—students, beginners? No, an excellent class of men. But every one of them now asks for a commissioned rank. Do not want to see one branch of the service get a commissioned rank and have thirty-odd men the other way in another branch of the service.

The following are extracts from the report of the Committee on Naval Affairs which accompanied Hon. Robert G. Cousins' remarks in the discussion:

Surgeon-General Rixey informs this committee that the dental operations performed by the hospital stewards "are limited to simple procedures and urgent cases," that "this arrangement is a makeshift unsatisfactory to the bureau," that "the necessity of the care of the teeth of the enlisted men existed and its importance to the health of the navy is appreciated," and therefore this makeshift was resorted to "until legislation could be obtained giving advantages to the enlisted men of the navy similar to those which the army has had for several years."

When men are kept at sea continuously for a considerable time or located at remote stations where dental surgeons are inaccessible, it seems to us an inexcusable hardship, as the neglect of proper treatment for the teeth may ultimately result in great expense through pensions, besides the inhumanity and suffering which necessarily occur in the absence of prompt and scientific treatment of the teeth when needed. The charts or diagrams of some fifty or more particular cases presented to this committee from a single station at Newport, R. I., is ample proof of conditions which ought not to exist. One apprentice but sixteen years of age had lost every one of the teeth from his upper jaw; another, aged eighteen years, exhibited cav-

ities in his fourteen upper teeth; another, aged sixteen years, had lost practically all of his molar teeth, and the few remaining teeth were imperfect; another, aged seventeen years, had lost seven teeth, and another, aged eighteen years, had lost seven molar teeth. Several others of the fifty cases from sixteen to eighteen years of age had lost from three to six teeth. It was said of these cases, in general, that they presented either ordinary cavities of decay, dead teeth, inflamed gums, chronic abscesses discharging pus in the mouth, pus-producing diseases of the teeth, gums, and underlying bone, or germ-laden foreign matter in contact with the gums and teeth. Such conditions cause gastric and intestinal disorders, impair vitality, and make one more susceptible to infectious diseases. Experts in dentistry inform us that under present conditions a large percentage of the cases exhibited from this one station must inevitably lose their teeth at an early age, which may render them pensionable under existing law.

America, great in humanity as in courage, is the only nation which has made anything like adequate provision for the dental care of her soldiers, and her legislative body was the first in the world to do so. The dental force in the South African war, according to the *London Lancet*, was "one dental attendant to this British army of 200,000 officers and men"—Mr. Newland Pedley, who left England as a consulting dental surgeon to treat the special cases of injury and diseases of the jaws, and who for nearly six months worked under varied conditions, on shipboard, in a tent, afterward in a shanty, and subsequently in a hut. "Occupation for me," he writes, "was never lacking from the first day of the outward voyage, for there was the usual epidemic of influenzas, followed by numerous cases of neuralgias and toothache. I managed to do some temporary fillings and some extracting." The Admiralty appointed five dentists. However inadequate that might seem considering the large *personnel* of the navy, the recognition of dentists by the naval authorities was very welcome. The report of the Interdepartmental Committee of the Admiralty and War Office dealing with the teeth of the troops was on the right lines: that if any

permanent improvement was to be expected either in the teeth of recruits or in those of the people generally, inspection and treatment for the scholars in the elementary schools must be provided—inspection for all, treatment for those who could not afford paid help.

Every valid argument used in favor of dentists in the army may be urged with equal force in behalf of dentists in the navy—at naval stations at least. As the U. S. army has its dental surgeons, the navy certainly needs the same adjunct to its medical staff. Really the naval man has fewer opportunities than the military to secure the services of a civilian dentist, on account of his environment. There is no doubt that the extremes of heat, cold, and exposure develop dental ailments in an appalling way on shipboard. Dr. V. A. Latham's experience with naval men and young fellows in the naval reserve has been that men who have worked on gunboats complain bitterly of the need of the dental surgeon, more so even than in the army. "It is a very good thing," says Dr. Latham of Chicago, "to show lawmakers the necessity for the services of the physician and the dentist," and Dr. E. A. Bogue of New York echoes that sentiment, saying, "Those things should be put before the legislators. They do not partake of politics or personalities, but they do partake of the humanitarian feeling." Dr. Bogue believes that a statement of the expense of treating the sick in hospitals because of dental diseases and the amount of saving that might be made, would present an economic feature which would also appeal to the lawmakers. Dr. B. Holly Smith of Baltimore, who says, "The dentist is the helper of every enlightened surgeon," tells of a lady who happened to need some dental attention, and who on the ship coming home from Europe, "suffered terribly, and the whole boat was utterly demoralized by that woman's suffering during the entire trip. The general surgeon was there and he extracted one tooth, but that did not relieve her, and he did not want to take out any more. He kept her under an

anodyne until they got into port, and within twenty minutes after her arrival she was relieved by a competent dentist."

If the services of the dental corps of the army, as officially published, have almost immediately relieved many cases that were previously carried for several days on the company's sick report, why could not a similar statement be made of the navy, under like conditions, where the record gives 268 days as the total number of sick days from two cases of dental caries, and the daily average of all cases under treatment at the same time as only 7.36? "Of what use are the sinews of war, if the sinews of men's arms are wanting?" Dr. F. L. Fossume of New York tells how "a great calamity befell the British army in the South African war," referring to the laying up of the men with dental diseases, loss of teeth, finally their refusing to do duty on account of the condition of the teeth.

If public sentiment is so aroused as to demand enlightened and adequate dental treatment for the officers and enlisted men of the navy—and certainly its expansion and its prominence in recent years have been before the people—it will be found feasible to meet the demand. Socrates is credited with having said, "The state is a great and noble steed, who is tardy in his motions, owing to his great size, and requires to be stirred into life; hence a gadfly is necessary to fasten on the state to arouse, persuade and reproach, lest the state may fall asleep." That the services of skilled dentists are required by the navy cannot be questioned by those acquainted with the conditions and who know the far-reaching results of neglecting dental disorders. With the increase in the *personnel* the question of attention to the teeth of the enlisted men of the navy is becoming more and more pressing each year, and there are few matters within the province of the medical officer that at times cause him more embarrassment.

Who are so competent to know the requirements of naval service as those who are familiar with it? The Secretary of

the Navy and the Surgeon-general should not be criticized for recognizing the obstacles which surround the launching of a new line of service—a dental corps in the navy—an innovation contrary to established policy. The only hope for passing a bill to add a corps of dental surgeons to the Bureau of Medicine and Surgery of the navy is by co-operating with these officials. As late as last March a Navy department letter was sent by the Secretary of the Navy to the chairman of the Committee on Naval Affairs of the House, saying—

While the department is in favor of the enactment of legislation to provide for a corps of dental surgeons in the navy, as will be seen by reference to my annual report for 1907, the provisions of bill H. R. 548 in several respects do not meet with approval.

For instance, to establish fixed grades and provide for promotions in a corps all appointments to which, at the outset at least, should be temporary in character, is not considered necessary or advisable at this time. Furthermore, if this bill should be enacted, authorizing the revocation by the President of any appointment made under its provisions "when, within three years from his appointment, an appointee discloses inaptitude or lack of professional fitness for the service," the status of appointees thereunder would be somewhat anomalous, in view of the provisions of existing law that "in time of peace no officer shall be dismissed except in pursuance of the sentence of a general court-martial."

Attention is invited to the bill H. R. 16620, authorizing the appointment of dental surgeons in the navy, the provisions of which are in line with the department's views on the subject. It will be noted that under this latter bill all appointees will receive "the rank and compensation of acting assistant surgeons in the navy, . . . and their appointments shall be for a term of years and revocable at the pleasure of the President. As will be seen, the expenditure involved by such legislation would be less than that required by the terms of H. R. 548.

The text of the bill (H. R. 16620) which Admiral P. M. Rixey, Surgeon-general United States navy, recommended and Hon. V. H. Metcalf, Secretary of the Navy, approved, consists of one paragraph, which follows:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

That the President be, and he is hereby, authorized to appoint dental surgeons to serve the officers and enlisted men of the navy and marine corps, not to exceed thirty in all. Said dental surgeons shall be attached to the medical department of the navy; shall have the rank and compensation of acting assistant surgeons in the navy; shall be graduates of standard dental colleges, trained in the several branches of dentistry; within the age limits of twenty-four and thirty-five years; of good moral character and professional standing, and shall pass a physical and professional examination; and their appointment shall be for a term of years and revocable at the pleasure of the President: *Provided*, That the dentist now employed at the Naval Academy shall not be displaced by the operation of this act.*

The following are extracts from the report of the Committee on Naval Affairs submitted by Hon. A. F. Dawson of Iowa to accompany bill H. R. 16620:

This bill provides for the appointment of thirty dental surgeons "with rank and compensation of acting assistant surgeons." Their appointments are made for such term as the President may determine, are revocable at his pleasure, and do not carry the right of promotion nor age-retirement pay. For seven years the Navy department has recommended legislative authority for the appointment of dental surgeons and presented evidence that their service is imperatively re-

* January 6, 1909, this bill passed the House without change. In the Senate, in modified form, it was offered by the Committee on Naval Affairs as an amendment to the naval appropriation bill, but ruled out on a point of order. With the approval of Surgeon-general Rixey, U. S. N., it was proposed in the Senate, February 16, 1909, to add as an amendment to the committee amendment after the word "act": "*Provided further*, That the rank of acting assistant surgeon shall carry the like pay and allowances of the rank of assistant surgeon; and all dental surgeons shall after three years' service from the date of their first appointments, if morally, mentally, professionally, and physically qualified, be eligible for permanent appointments as dental surgeons in the U. S. navy with the rank of assistant surgeon."

quired for humanitarian and economic reasons.

The urgent need of dental surgeons in the navy is emphasized by the Surgeon-general of the navy in the following statement:

Like the eyes, the teeth are coming properly to be regarded as intimately and widely associated with the various organs and functions of the body; and that defective teeth may be responsible for much ill health is recognized by all who keep in touch with the accumulating truths of medical science. The naval surgeon is alert to detect dental disorders early lest an aggravation of them produce grave illness. He, however, has not that special knowledge required to fit him to cope with diseased teeth in a final manner. He can and often does put in temporary fillings and treat the medical and surgical complications incident to dental disorders and he often extracts such teeth as are not worth preserving, but naval surgeons are not expected to deal with dental disorders in a radical manner. The practice of dentistry requires a special education and training.

The teeth and the mouth are indubitably important factors in the causation of certain diseases of bacterial origin. This is not a hypothetical conclusion, for it has been proved beyond doubt that not only are bacteria found in great numbers in uncared-for and neglected mouths, but their disease-producing properties are greatly increased, particularly in and about decayed teeth. Much of the tonsillitis and pharyngitis in the navy can undoubtedly be traced to bad teeth, as can also deranged digestion and general physical deterioration. In this connection it is not improbable that the teeth are an important contributory factor in tuberculosis by producing a state of lessened resistance to the disease by the constant absorption of poisonous matter.

In thus indicating the prominent reasons for the navy's need of proper dental services, it may be added that a bad tooth may occasionally give rise to serious complications, which may even endanger life . . . [Referring to two cases reported, the first by Surgeon G. H. Barber from the U. S. S. "Baltimore"]—

While making a run between Singapore and Colombo, a death from pneumonia occurred. The patient had an ulcerated tooth, which was extracted at Singapore; this operation was followed almost immediately by the development of a diffuse cellulitis involving both sides of face and neck. Abscesses were promptly opened and drained, and the symptoms, both objective and subjective, had

nearly disappeared, when pneumonia developed, and the man died thirty-six hours later.

Another fatality in the case of an enlisted man is reported, due to blood poisoning, which developed from gangrene of the nerve of a molar tooth and which might not have occurred had the man received timely experienced dental treatment.

The Bureau of Medicine and Surgery seeks to prevent accidents of this sort and to secure a reasonable conservation of the enlisted men's teeth by the timely employment of dental surgeons. It is believed that it would be a good general measure to have all recruits that are assembled at receiving ships and stations examined, with a view to securing the highest physical efficiency in this respect before such men go to sea.

Let us consider the subject under three heads: What do we want? Why do we want it? What is the best way of getting it? Oneness of aim does not imply identity of means. A cautious conservatism, however, is the duty of the hour; conservatism in method, and co-operation and forbearance in thought and action. "Promised changes in the status of the army dental surgeon is a lesson. . . . Start the navy dental surgeon right by the first legislation on the subject. . . . It is important that the navy dental surgeon should be required on entering to meet the standards of regular officers."

Apparently House bill 16620 will "start the naval dental surgeon right," from our viewpoint, if the statement of Dr. Wms. Donnally of Washington, D. C., before the sub-Committee on Naval Affairs, March 11, 1908, is accepted as the voice of the profession. He was the only dentist present, and said, "I represent the National Dental Association. . . . We are, under the circumstances, willing to accept that bill, so far as the National Dental Association is concerned." The chairman replied, "I think, doctor, we are all convinced as to the necessity of some kind of a bill. The question is, What sort of a bill shall it be?"

As no dental corps exists just now in the navy, if too much were asked it might prevent anything being obtained. We have to begin by asking for a little,

increasing gradually. That is my idea. "First the blade, then the ear, then the full corn in the ear."

WHAT IS WANTED.

We want a corps of dental surgeons in the U. S. navy assigned to such naval stations and fleets as would make their services available to the officers, enlisted men, and apprentice boys of the naval and marine military service and training schools. With the army dental corps established as a precedent—it is the thin edge of the wedge—the creation of a similar service in connection with the navy should be readily accomplished. If the government finds the dental corps an indispensable part of army medical practice, should it not, at least, provide for dental treatment for the enlisted men of the navy, especially those on foreign stations for a period of two or three years, and for those restricted in or deprived of their liberty? If the government considers it necessary to employ surgeons, pharmacists, and chaplains in the navy, why does it not employ dentists?

The army service enjoys free treatment by dentists employed in accordance with law, and it seems an unjust discrimination against the enlisted men in the navy not to provide for similar dental work, especially in view of the universally recognized importance of sound teeth in military service.

WHY IT IS WANTED.

Not forgetting that military and naval hospitals never originated from the spirit of humanity, but have been born of sheer necessity, we want a corps of dentists in the U. S. navy for, we argue, not only humanitarian but economic reasons. The amount of dental disease that exists in the navy and the consequent treatment required by the enlisted *personnel* of the service is considerable. The reports from only two of the stations where dental treatment is being given, by hospital corps men who have some knowledge of dentistry, embrace some 4631 cases of

almost every character of dental work. This statement gives a fair idea of the navy's need in regard to dental services, and often when it is impossible, even by makeshift provision, to meet such demands, the cases are obliged to seek outside relief, probably of an indifferent character and at an expense beyond their means, besides entailing a great sacrifice of time and loss to the government in services. At many of our stations and on ships dental attention of more than the simplest character is not available, and the consequences are great suffering and disability and impairment of efficiency. In a reported instance so many of the ship's crew were in need of dental services that a dentist was engaged to visit the ship. In other instances, at stations where it seemed advisable, such arrangements could not be effected.

Surgeon W. H. Bell, U. S. N., writing from the Isthmus of Panama, said:

During February 1905 a problem presented which gave us considerable worry, as there appeared no immediate solution. It concerned some very necessary dental work which thirty-five or forty of the command required to have done. Quarantine was then in force against Panama on account of yellow fever, and that fact, therefore, excluded us from the possibility of sending our men there for dental services, and as there was no dentist in Colon or anywhere else along the line, the problem became a difficult one. We tried in vain to persuade one or the other of the American dentists on the Isthmus to come to camp with his outfit, and the only other resort was a native dentist, whose work, as far as it came under our observation, was so inferior that we hesitated to employ his services, but even he finally would not come. It was an experience which forcibly indicated the need of dental surgeons in the service. The end of the whole matter was the detachment of most of the men without having received any but palliative treatment, and their transfer to Santo Domingo, where their chance for needed attention was, if possible, worse.

This quotation is only one of many similar reports from the various naval stations and ships, and with reference to our extensive service in equatorial latitudes, it is to be pointed out that teeth deterio-

rate with particular rapidity in the tropics. The importance of having skilled dentistry within the reach of those on duty in the outlying and isolated stations is evident, and at the large stations, where recruits are assembled and apprentices are trained, the value of the service of such professional attention is of no less moment.

It may have been this experience of Dr. Bell which prompted him to have the house of delegates of the American Medical Association indorse the employment of dentists in the following resolution, after the section on Stomatology had voted that dental surgeons ought to be appointed to serve the officers and enlisted men of the navy and marine corps:

RESOLVED, That it is the sense of this house of delegates that the effort of Surgeon-general P. M. Rixey to secure legislative authority for the employment of dentists in the U. S. navy be approved, and that the Committee on Medical Legislation be instructed to exert such influence on Congress as in its judgment may be deemed wise in support of the measures making such provision.

A writer in the *Medical Record* states that it is of no use to dose patients with medicine when many of them are constantly swallowing any quantity of germs from unclean teeth, and in many cases large amounts of pus from abscesses. Another writer tells this story:

On the march every man was his own dentist. Exercising that resourcefulness which necessity breeds, soldiers would plug cavities in aching teeth with tobacco, cayenne pepper, rubber (scraped from waterproof sheets), anything calculated to cover or kill an exposed, throbbing nerve. Such treatment rarely proved effective. After tossing through sleepless nights, the swollen-faced victims would parade with the sick, take the operating chair—an empty biscuit box—and submit to the doctor's hug.

Writing about the South African war, an English dentist says:

It was necessary that the teeth of the soldier should be especially good. In the early days of the campaign, when volunteers were rejected on account of bad teeth, the

War Office was laughed to scorn. "We don't want to eat the Boers," was said derisively. No, but they had to eat something a lot tougher than human flesh, and hundreds of men have latterly been invalided home on account of bad teeth.

A writer in the *Pacific Dental Gazette* says:

At the Naval Academy our government finds it necessary to employ a dental surgeon in order to make good officers of midshipmen. Why is it not necessary to employ dental surgeons for them after they have left their alma mater and are thousands of miles from home?

Although the men enlisted for the naval service have, presumably, sound teeth, yet there is suffering among them from various dental troubles, owing largely to the fact that from the time of enlistment to the time of discharge—four years—they have little opportunity to secure the services of a dentist, and their pay is such that they are in no position to engage qualified civilian dental surgeons.

Dr. Otto Hollinger, Chicago, says:

It was my good fortune to serve the United States navy in the Spanish-American war as an ordinary sailor, and I agree in the contention for dentists in the navy and in the army. When we were on board the flag-ship "Lancaster" at Key West, preparatory to going to Cuba, a marine came to me with an aching molar. I did not have any medicine or instrument with me, and I sent him to a surgeon who found a third molar aching very badly. The surgeon thought that by extracting the third molar he would relieve the toothache, but he broke the tooth off, and thinking the tooth was locked with the second molar, he extracted the second molar also; but the toothache was not stopped, and he then extracted the first molar, which also was decayed. There were three teeth lost, and the poor fellow was sent out to service, but he came back in about two weeks in a very bad condition and was sent to the hospital, placed under a general anesthetic, and the roots were taken out.

In the time of service, men should have attention given to aching teeth, and then when they come into port they should receive the best that the science can give, because these men are giving their best to the government.

Medical Inspector Howard E. Ames, U. S. N., recently senior medical officer at the Naval Academy, has given me the following regarding his experience and practice respecting the teeth in his naval career: The sad neglect of the teeth and the apparent wide ignorance of their use and value have caused so much suffering that he has always endeavored to prevent and correct the causes of such troubles. The number of sick days caused by defects in the teeth in the navy would be surprising if known. The sacrifice of teeth by extraction that could have been saved by the dentist is unknown. He has always when possible arranged with some dentist to attend the requirements of the crew in their tooth troubles, for which special rates were made in keeping with their pay. This was done to encourage the men whose pay is not sufficient to secure the services of a competent man, unless the conditions were explained, and also to prevent their falling into the hands of quacks.

In the Greely Relief Expedition the teeth of every member of the crew of the "Bear" were carefully examined and all defects remedied. The result was that not a man suffered from toothache, while on other ships trouble of the teeth occurred. On the U. S. S. "Detroit" he carried a dentist from Hong Kong, China, to Nagasaki, Japan, a distance of two thousand miles, to put the crew's teeth in order, and before the trip the dentist worked on the ship over a week, and after he reached port a week's more work kept him busy.

It has been his habit when the ship is in port for any length of time to carry out these ideas, and the result has been most satisfactory. Further, he is a strong advocate for the establishment of a dental corps to be maintained at each of our naval stations.

Rear Admiral Caspar F. Goodrich, U. S. N., in writing of the camp of sanitation, League Island, says:

The wants of the men in one essential were specially supplied, and on a scale novel to my experience. Surgeon Biddle interested himself so much in this matter that it was not possible to deny him, even had I been moved

to do so. A tent was set apart near his dispensary and a competent dentist engaged, who brought down his chair and engine and all other instruments of torture which a diabolical ingenuity has devised. His victims are like the sands of the sea, but happily sorrowing, they left the camp and went into the service every man jack of them sound in teeth. It goes without saying that a special schedule of prices was agreed on by which the men secured first-class work at the lowest possible rates, and the dentist got lots of valuable experience.

Captain Howe, who possesses the double qualification of active service in South Africa as a combatant during the war and a licentiate in dental surgery, says that hundreds of otherwise suitable recruits are rejected owing to defective teeth, which could be made serviceable at a relatively small cost, and even when a man is accepted the state, as a rule, does nothing to conserve his teeth. Should a soldier's teeth commence to decay nothing is done for them until they ache, and then they are extracted, the result being that when the reserves are called up, many men are rejected because they have an insufficient number of teeth. The loss in the fighting strength of the army during the late campaign owing to bad teeth and complaints traceable thereto was so great that before the end of the war the government had sent out twelve civil dental surgeons, the result being a marked success. A dental surgeon has been sent out to Somaliland for duty during the present campaign, and at home two dental surgeons are being employed temporarily in London and in Aldershot, with most successful results. Captain Howe lays stress on the absolute necessity of a policy of conservation of teeth during the whole of a man's service, and suggests a plan, including the appointment of a staff dental surgeon at the War Office, to secure the attainment of this object.

You all know the record of Japan in maintaining the health of her fighting force. Surgeon Wm. C. Braisted, U. S. N., now of the Navy department, Bureau of Medicine and Surgery, in an instructive and inspiring report to the Surgeon-general on the Japanese naval medical

and sanitary features of the Russo-Japanese war says, "The Japanese as a nation are characterized by a certain cleanliness, both of the body and surroundings," and quotes official sanitary rules issued in neat pamphlets to each man of the force, from which I copy these rules about the teeth:

(1) Every morning the mouth and teeth should be carefully cleaned.

(2) Whitlow, boils, toothache, and any such bodily disorders, even of a slight nature, tend to decrease the fighting capacity of an army by obstructing the free action of the body. As these disorders are mostly caused by uncleanly habits, it is necessary that everyone should keep his body clean.

Stanley Washburn, a correspondent of the *Philadelphia Evening Bulletin*, wrote from Manchuria:

The Japanese make a great point of the preservation of teeth. They figure that a soldier with a bad tooth cannot eat, and that a soldier who cannot eat grows weak and cannot fight for Japan. Therefore a bad tooth may mean a bad soldier, so they go for the teeth, in the first place by issuing tooth-powder to all the men, and in the second place by having the dentist. And the moment a soldier goes to the bad with his teeth he is promptly ordered to go in for repairs, and thus the possible weakening due to lack of food is nipped in the bud.

The French under-Secretary of State for War has recently issued a circular regarding the dental hygiene of the army. Up to the present time this matter has met with very little attention in the army, in spite of the fact that dental lesions have been responsible for a large number of days of absence through sickness; thus, in 1903, they caused 1845 soldiers to enter hospital, whose days of treatment amounted to 18,639. In the future the school of hygiene at Val de Grace will give a course of instruction in stomatology. When recruits are enrolled the examining surgeons will make special reports on the state of the mouth and teeth of each soldier, which will be kept up to date by a three-monthly examination. This new system will not only save a number of days of sickness among

young soldiers in the future, but it will instil into them habits of hygiene which they may keep up after they have left the colors and which they may spread around them to the public welfare.

Lieut.-col. Wm. Hill Climo, M.D., brigade-surgeon, London, in an exhaustive article on the personal hygiene of the soldier, says:

It used to be my custom to examine the mouths of all young soldiers on joining their regiments. The want of care shown by them was phenomenal. Between the teeth, often unsound, were lodged broken pieces of food. In many instances I often found it to amount to twenty per cent.; the gums were soft and spongy, and bled on the slightest pressure. What a constitutional state did this represent to resist disease, and what a nest for the germs of zymotic diseases to rest and develop in! It will, perhaps, be thought that these are trifling matters. Such is not the case; I vouch for their prime importance. The importance of sound teeth to the soldier is very rightly insisted on, though no doubt it is not so much so as in former times, when, because of long voyages, or protracted campaigns, hard biscuit formed the staple food. Still there can be no doubt, to preserve the health and to ward off many forms of sickness, a good set of teeth is no mean armament. It has often occurred to me, this being so, why it has been that, while the state of the teeth on enlistment is a matter of stringent regulation, yet afterward it is practically neglected. The army medical staff, by their present training, are not competent to deal with it. In every garrison, if not certainly in every district, there ought to be appointed a duly qualified dentist, and for duty with troops.

W. O. Owen, major and surgeon U. S. army, says:

For seven years I have been giving especial attention to the diseases of the mouth and teeth because of their influence on the general health. During the time in which I was in charge of Corregidor Hospital about three hundred soldiers, more or less disabled by dental disorders, were under treatment. I recall one case in particular, a diarrheal trouble of several months' standing, which resisted treatment until placed under the care of a dentist, whose treatment, directed to the mouth alone, effected a cure and the restoration of the soldier to active duty in two weeks.

There were fifteen or twenty similar cases, known as pyorrhea of the sockets of the teeth, with pus bathing the teeth, mixing with food, and entering therewith the alimentary tract.

HOW TO OBTAIN IT.

As to the best way of getting a dental corps in the navy, first and foremost should be sought and obtained, if possible, the recommendation of the Navy department. "With the recommendation of the Navy department," says the committee of the National Dental Association, "it would be easy to secure legislation that would supply the navy's needs in the premises." That has now been given so far as the Bureau of Medicine and Surgery is concerned, in these words of Surgeon-general Rixey: "The bureau recommends that Congress be asked to provide for the employment of dentists to be stationed at the large stations at home and all the stations beyond the territorial limits of the United States."

Granted that the claim for a commissioned status has been worked out as a separate proposition, a bill must be carefully considered in relation to the established order into which it must go if enacted into law, and it must work in unison and harmony with naval practice, otherwise the achievement would be mischievous—for it must be borne in mind, as Secretary Taft once said, that "The dentist has no administrative duties to perform, and practically no danger on the field of battle—he presides over a chair."

Let us adapt ourselves to the situation. The dental surgeons of the army are assigned to stations in Cuba, Porto Rico, Alaska, the Philippines, and the United States. Similar assignments could be made to naval stations, if dentists were employed in the navy—say, to Boston, Mass.; Newport, R. I.; Brooklyn, N. Y.; Philadelphia, Pa.; Washington, D. C.; Annapolis, Md.; Norfolk, Va.; Havana, Cuba; Bremerton, Wash.; San Francisco, Cal.; Yokohama, Japan; Cavite, P. I.; also to Montevideo, Uruguay, and Villefranche, France, where the ships of the South Atlantic squadron and the European squadron, respectively, stay for

some time. In this way, although the question is surrounded with difficulties, it seems possible to bring into force a system that shall adequately deal with it. At the naval stations, where ships are laid up for repairs and receiving ships are located, large numbers of enlisted men are found who have time which could be utilized by the dentist who may have the advantage of abundant room. Strange as it may seem, until the recent visit of the fleet to the Pacific, a naval vessel was not at sea for more than a month at a time, and naval ships spent fully as much time in port as they did in cruising. I gathered as the unanimous sentiment of medical officers and others of the navy that there is no place for the dentist on sea-going vessels unless it be the hospital ships, or with each fleet.

Government ships are provided with dental cases, each containing a set of forceps, elevators, excavators, engine burs, socket handles for burs, plastic filling instruments, and high-grade gutta-percha. These are used by the surgeons and hospital stewards, some of whom have taken courses in dentistry. Dr. C. L. McPike of California, who is located near Mare Island, has "had naval surgeons call for a list of materials and medicines to be used in relieving the various pains emanating from the mouth." Practically there is no room on ships for dental work, for chair, cabinet, engine, etc. If located in or near the "sick-bay," as the hospital is termed on a man-of-war, the dentist could work on bright days only. As to living quarters there might be trouble.

Recognizing that the equipment of the general surgeon is not wholly adequate to relieve the diseases incident to the mouth, teeth, and jaws, the navy having no dental corps, as you know, Surgeon-general Rixey has provided a course of lectures in the Naval Medical School in Washington for the officers of the medical corps of the navy. These are on elementary dentistry and instruction in the treatment of ordinary dental troubles, including relief from suffering, the insertion of temporary fillings to protect teeth from further decay until a favor-

able opportunity can be secured for permanent work, and the extraction of teeth. This action, together with the policy of the Bureau of Medicine and Surgery for the employment of dentists—shows that the Navy department realizes its responsibilities. My orders from the Secretary of the Navy for this duty, for past terms, were in part as follows: "You will proceed to Washington, D. C., for the purpose of delivering lectures on the subjects of dental emergencies and the care of the teeth of the navy *personnel*, before the Naval Medical School. On the completion of this temporary duty you will return to the Naval Academy, Annapolis, Md., and resume your regular duties."

In conclusion, it is not so much to the facts presented to Congress in the reports of its naval committee—which are disquieting enough, especially respecting the teeth of apprentice boys—to which attention is directed at this time, as it is to the intelligent manner in which members of the House advocated the appointment of dental surgeons for the navy—which the American Medical Association indorsed—and Senator Bulkeley's warning this afternoon that "with wide differences of opinion the profession will never secure any legislation whatever." In the words of your Dr. Jas. McManus, "Experience had convinced him that if the members of the dental profession had been in greater unity, showing no feeling, they would have got much quicker action." It seems to me that the strength of the movement lies in the fact that it is indorsed by the Surgeon-general of the navy and the American Medical Association, which has a membership of many thousands, whereas the National Dental Association includes only about two per cent. of the total dental practitioners in the United States, respecting which the editor of the DENTAL COSMOS says:

It is evident that the scope of activity and influence of the association is much smaller than it ought to be and might be. To our eternal discredit we have after fifty years of fussing been unable to impress the national government with the righteousness of our de-

mand for a commissioned corps of dental surgeons in connection with our defensive service. We do not unite, and therefore we cannot co-operate; our efforts are sporadic and spasmodic, and our results in the larger political sense practically nothing, so that the great things of which we are capable in the way of progress as a profession are yet to be accomplished.

Discussion.

Dr. H. E. HOSLEY, Springfield, Mass. It has given me great pleasure to listen to Dr. Grady's paper, and I think we are especially fortunate in having a man who sums up the situation and presents it to us in such a clear manner. I have had the pleasure in the past of discussing this subject with the essayist at some length, and I know that he has done a tremendous amount of work in the place where it means something, that is, with the legislators and with the officers of the navy. Dr. Grady in this work has been greatly handicapped by not having the unanimous co-operation of the dentists. I believe that it is our duty to the government and to ourselves to see that in the future we present a solid front. This summer I have discussed with a retired admiral the nature of the dental service in the navy, and some of the things which he said in regard to the matter would not bear quotation; he expressed himself in terms which meant that there should be action, and it seemed to him unexplainable that the service had not been improved; he suggested that the influence of the dental profession must be very small with the representatives in the national government when they could obtain no better results. Dr. Grady is placed in a position where I believe he has an influence that will be felt among these men, and it is up to us individually to put our shoulder to the wheel and give him all the help necessary. We are fortunate in having a man of a large caliber, a man of his standing with the navy officers, a man who commands the respect of these men. Stop and think what it would mean if a man in Dr. Grady's position did not have the respect of the commanding officers. Such things have

happened in the past. I know from contact with army officers that there is no class of people who have a keener appreciation of the value of the teeth than they have. Richard Harding Davis, in one of his writings, spoke of a little incident which I think brings out the point I have just mentioned. He was talking with a foreign attaché who was smiling all over his face as he saw a regiment going to the front in the Spanish war in Cuba, and said, "This appeals to me as being a serious moment; just see those regulars stripped down to the smallest possible equipment, and armed with a tooth-brush." That is dental education for you! The regulars appreciate the value of the care of the teeth. I should like to see the dental profession get together and co-operate with Dr. Grady. There are many good men who support this movement. We have good men here tonight, so let us take the matter up and work for the accomplishment of what we all know to be for the good of the army and navy.

Dr. I. B. STILSON, Stamford, Conn. Why would it not be a good idea for every local society to form a committee and talk this matter over, and then send that committee to visit their representative in Congress, and give him the desired information in regard to what they expect him to do in regard to the matter?

Dr. JAMES McMANUS, Hartford, Conn. Dr. Grady knows very well what opinion I have of him and of the work which he has done in the past years. I shall not compliment him very much, but I wish to say that it is a fortunate thing that the members of the House of Representatives come before the people for election. The senators, of course, are appointed by the votes of the members of the legislature, but in every district where a representative is nominated to Congress there are dentists, and if these dentists called on these representatives or candidates, and impressed them with the necessity of taking action in this matter, and if they gave them to understand that their election depended on their course, it would produce great effect. The only way in which we can ever

succeed in these things of a political or semi-political nature is by united action. In the years past many of us have talked together, but we have gone no farther. Some years ago I was asked to use my influence in this matter in my locality, and I wrote personal letters to nearly all the senators throughout New England, and to several in Kentucky and New Jersey, also to members of the House of Representatives, asking them to take action and to work for the passage of this bill. Very nearly all of them sent me the usual complimentary reply that they would take the matter into serious consideration. Some of them really did so, as you know from what Senator Bulkeley said this afternoon, namely, that the Senate committee was unanimous in reporting the bill favorably. If the dentists throughout the country would do as they should do, we should have no trouble, but in years past the trouble has been that our National Association is small in numbers, and instead of having four or five hundred members we should have at least fifteen hundred; instead of having three hundred in this organization we should have five times as many members as we now have. The trouble is that we do not get together and work as a unit. I am sorry for that. I have been engaged in society matters for years and know that many movements have been started toward trying to increase the membership, but still we have failed in doing so. Now, this association represents the states in New England, and if we had a larger number from the different state societies, and could arouse their interest, we could increase our membership and accomplish a good deal. In my opinion there is enough evidence that we might be able to carry this bill through the next congress. There is one thing the importance of which you all should recognize. A few years ago, when Dr. Grady was asked or ordered by his superior officers to talk to the medical men on dental subjects, he found that kinder feelings existed among the medical men toward competent dentists, and tonight we have good reason to be proud of an honor that

has been conferred upon us, as we are the first dental association on record at whose meeting a member of the dental profession in the government's service has been ordered to attend. Personally, and I think in harmony with the sentiment of all those present, I wish that the association would pass a vote of thanks to Dr. Grady for giving us this paper and for showing such keen interest in the soldiers and sailors of the army and navy. I make that as a motion, Mr. President.

Motion unanimously passed to extend a vote of thanks to Dr. Grady.

Dr. M. L. RHEIN, New York, N. Y. After having spent the past few years in thoroughly investigating the subject under discussion at the present time, it is a continual surprise to me to find how little is known by the average dentist of the conditions about which Dr. Grady has been speaking to us. The subject has no bearing on dental practice, nor does it affect the personal welfare of any of us outside of the corps, and I regret to say that this very likely accounts for the general ignorance of this matter on the part of the profession at large. Until the members of the profession have a thorough personal knowledge of the facts at issue, there appears to be very little chance for proper legislation on this subject. It is a serious question whether it is really the best thing for the profession to indorse the navy bill spoken of by the essayist tonight. Not that we do not most heartily favor a measure that will introduce dental service in the navy, but rather let us consider right now whether it is not best to oppose a measure that gives questionable rank and to demand one with proper rank or none at all. We give utterance to this thought after considering the amount of untiring energy unsuccessfully put forth during the past seven years toward having the contract service of the army changed into one that will give the men a proper commission and status in keeping with the positions they hold. Under these circumstances, is it not perhaps wiser to oppose this bill than to favor it? I understand from my conversation with Admiral Rixey that he thoroughly appreciates the

advantage of a dental corps in the navy. I sympathize heartily with his attitude when he speaks of the difficulties of starting a new corps in the position that we would like to find it in, and realize how honestly he believes that the only way is for the corps to start on the basis explained in this bill, and hope from this to steadily improve their status. He may be correct in his position, but we must not forget the clause which makes the members of this corps removable at will by the authority of the President. Is this practically much more than the contract system in the army? Will this corps be advanced any more rapidly than the army corps has been? The issues of these two corps are so closely interwoven that it is impossible to properly discuss one without considering the other. When the army corps was first instituted, many of us opposed its formation unless the men were properly commissioned, and I question whether every fair-minded member of the profession today, who has investigated this subject, will not agree that it would have been for the best interests of all concerned if such a policy had been adhered to.

We have all been very much interested in listening to Senator Bulkeley's remarks, especially to his references to the difficulties encountered in procuring legislation and the friction that appears to exist among the profession at large. Unfortunately, there is too much truth in this criticism of the senator's. The question which we as citizens of the United States have to consider is: What is this friction due to? Differences of opinion as to details of men working in harmony for a common cause for the common good of all concerned are not productive of injury to the cause. It is only when the malign influence of political power, position, etc., is brought to bear on a movement of this kind that all possibility of harmony is destroyed. It is the sort of political intrigue and unquestionable desire for power, if not notoriety, that has caused most of the trouble. I have taken a great deal of pains to investigate the position of some of the men who are representing us in the army at

the present time, and I could give you a very pathetic picture if I would read some of the letters which I have received from some of these men. There are so few men for the many stations that some of them have orders to move every two weeks or so from one camp to another. Those who are married have to pack up and take their wives along, and the hardship of this kind of a life can hardly be realized. Their salary is often used up in the necessary railroad and moving expenditures. When they reach a new post, they do not come as regular officers, as do the men in the medical corps. They have practically no rank of any kind; their position depends entirely on what their own individual bearing is able to produce for them at the different posts. Remaining such a short time, they are unable to show their real value and consequently they are generally left isolated, which is the most unfortunate position that a man can occupy in army life.

The peculiar thing about this whole matter that appeals most strongly to me at this moment is the fact that for seven years we have had a public agitation for the elevation of these men's position. It is right that this should be so, because these men are a loyal body of dentists. They have striven hard and have done most valuable service, and anyone who is willing to take the time, as I have, to investigate what they are doing, can readily have this fact proved. Under such circumstances, who could better understand the conditions of the service and what is required of them than the present corps in the army? Men who have placed their own future in their country's work; men who have been able to pass an examination so severe that the men who controlled this examination were severely criticized because of the high status demanded. Those of you who were present at the meeting of the National Dental Association at Milwaukee cannot easily forget the criticism that was there publicly made against the high standard demanded by Dr. Marshall and his corps, because a great many candidates recommended to the corps by men from different dental schools failed to

pass. Those who were present at that meeting will remember how emphatically the association sustained the high standard proclaimed by Dr. Marshall. On this occasion the gage of battle was thoroughly understood, and there was no question of the sentiment of the profession. It came out boldly against politics and in favor of the very best kind of a corps. Nevertheless, the men at the head of the corps, from that moment, felt the brunt of the opposition of numerous men whose candidates failed. Although the meeting "unanimously and with cheers" sustained John Marshall, it made him a marked man from that time. It does appear a little ridiculous that he should have been criticized for demanding a high standing because he thought that if the dental men were to hold their own with the rest of the medical staff, they ought to have the requisite knowledge to back them up. The fact is, that whatever position the individual man in the dental corps in the army holds today it is due to this position taken by John Marshall. It is on account of the various things that have transpired that so many men in the corps have lost confidence in the men who stood at the head of the Legislative Committee. Who should know the condition of affairs better than the men in the corps? They are the ones vitally interested; they know the facts as they really exist. I understand that a great many members of the corps wrote to the Executive Council of the National Dental Association, requesting them not to reappoint Dr. Donnelly on this committee, because they claimed he did not represent the real interests of the corps. What has been the result? The Executive Council at its meeting in Pittsburg on the 10th of October, instead of receiving these letters in the spirit in which they were tendered, discussed them in a tone unfavorable to the writers, to say the least. They intimated that such letters were insults to the members of the council, when the very essence of the council, according to the constitution of the National Dental Association, is to receive information and advice from men outside of the council

before they take legislative action. In a letter which I have received from one of the council the members of the corps are even threatened with dire punishment for having dared to obtrude their advice. As fair-minded men, I ask you is this reasonable, is it decent, is it honest? In whose interests are we agitating this subject? I have always believed that there were two interests at stake in this matter. First, the health of the mouth of the soldier, and, secondly, the body of men who have consecrated their lives to serve the soldiers, and if these latter do not know when their interests are at stake, who should know? The fact that I have been vilified for having opposed the reappointment of Dr. Donnelly on the Legislative Committee for the past three years, after reaching the conclusion that he was not the right man for this position, cannot deter me from still expressing my candid opinion on this matter. I have given much time and service to help, if possible, in placing the dental corps in a proper position, and as long as I have a voice to raise I shall continue to make what sacrifices I am able to make to further the commissioning of this corps.

You may ask why I have gone into this detail this evening. I believe that there should be an opportunity for the men who do not understand this matter to receive information in regard to what has transpired and is transpiring. A year ago, I accepted the position of delegate in the American Medical Association to obtain their aid for the furtherance of this measure. I sat in the house of delegates of the American Medical Association in Chicago last June, and while taking part in their dignified proceedings, I often wished that every dentist who has at heart the welfare of our profession could have been present, in order to note the contrast between a meeting of that body and the National Dental Association. In one word, I can tell you that there was an absolute absence of any petty political business in all the important matters that came before the session. At my request, my revered preceptor, Dr. Albert VanderVeer of Albany, N. Y., an

ex-president of the American Surgical Society, presented resolutions at that meeting, asking that the Legislative Committee further the enactment of legislation that would give rank to the army dental corps, and also offered a bill for the naval corps in accordance with the wishes of Admiral Rixey. This resolution, in accordance with the way in which business is done in the American Medical Association, was sent to the Committee on National Legislation, whose duty it was to investigate the matter and make a report back to the house of delegates. The matter was thoroughly threshed out in the committee room, and the committee sent back a report, recommending the passage of such a resolution, and it passed the house of delegates unanimously. In other words, they unanimously voted that their Committee on Legislation should further this measure. I might say here that the Legislative Committee of the American Medical Association consists practically of three thousand men, because back of the Legislative Committee of the association proper they have in every state a sub-committee, and every state committee man has under him a committee man in every county in his state, making an organization on legislation of three thousand men throughout the United States. The result of this action was published in a letter in the dental journals before the meeting of the National Dental Association at Boston. I leave it to you, gentlemen, whether we can afford to reject the aid of the American Medical Association in furthering this object which we have so unsuccessfully attempted to bring to fruition for seven years. Was there one single iota of effort made at the meeting in Boston to recognize the hand of fellowship passed to us by an organization of thirty-three thousand medical men at a meeting where there were over eight thousand in attendance? Not only was there no recognition, but a resolution of censure directed against me was introduced to the council because I had the temerity to appeal to the American Medical Association to assist us in this object. It

was only the good sense of the majority of the council that prevented this resolution from being brought before the body at large. Is it any wonder that we feel that the time has come for the reorganization of this association? It is very pleasing to think of the Committee on Reorganization which was appointed at that meeting. It is to be hoped that it will be the starting-point of a real association. I say that advisedly, because judging from the letters that have been sent to the *Items of Interest* and from the co-operation which the able editor of the *COSMOS* has given this movement, I have but little doubt that the profession is finally awake to the fact that we need a real national organization, which we have not at the present time. It is therefore to be hoped that the committee having this matter in charge will act in accordance with the spirit of the times. Dr. Grady told us tonight that legislation must be advanced under the direction of the department either of the army or of the navy. This is entirely contrary to what Dr. Donnally has been giving out for years—the fact that we will get our legislation with or without the consent of the War department. I have always questioned the wisdom or the possibility of this. It has always seemed to me almost impossible to obtain this legislation without the sincere co-operation of the War department. During my personal investigation, I found that in accordance with the red tape of the department they have felt themselves placed in opposition to the measures that have been introduced on this subject, because they have never been consulted. This is the way in which they have spoken to me concerning the matter. The present chief of staff, General Bell, told me that, personally, he was in favor of a commissioned corps. He said that he believed in the establishment of such a corps, but that he was not in favor of a bill presented by politicians or men representing organizations outside of the army. He said he wanted to hear from the men in the corps. The bill, he said, should come from them and from no one else, and only such a measure, he

claimed, would receive official co-operation. He even intimated to me that measures much more advantageous to the corps than our present bill provides for would be favorably considered, if they were introduced in the proper manner. When I am told this by the men at the head of the War department, am I to put my opinion against theirs? Does it not seem to be the easiest way for us of reaching the goal of success, which is so necessary for this worthy corps of men, by moving in harmony; that is to say, in accordance with the traditional custom of the department of War?

This is all I have to say, gentlemen, and I have said it simply in order to give you an insight into a little of the knowledge that I have gained on this subject.

Dr. GRADY (closing the discussion). I do not think that I care to say anything further. I could take up these points and answer them, but I feel as you do that the hour is late, and it would be tiresome to discuss this subject further at this time.

I would just like to mention one point that Dr. Hosley has brought out, which seems a good one. This organization represents six states, as I understand, and in one of these six states we have Senator Hale, chairman of the Committee on Naval Affairs. It seems to me that it would be well to pass resolutions expressing the sentiment of the association, and send copies to the senators and representatives of these states.

Dr. RHEIN, New York, N. Y. The one member of the Senate who is bitterly opposed to this legislation is Senator Hale. I visited him at his house in Washington and saw him in his library, and told him that I wanted to enlist his support as chairman of the naval committee in furtherance of this object, but his reply was, "Never, never, never!" That is the kind of a man you have to deal with, and he is the chairman of the

naval committee. The stronger, therefore, the resolution is that can be sent to Senator Hale from the Northeastern Association, which includes his own state, the better I think it would be, because he is most bitterly opposed to this movement.

Motion was made and carried to adjourn until Thursday afternoon.

THURSDAY—Afternoon Session.

The meeting was called to order on Thursday afternoon, October 22d, at 2 o'clock, by the president, Dr. Griffith.

The Nominating Committee presented the following list of nominations for officers for the ensuing year:

President—James E. Power, Providence, R. I.

First Vice-president—Ned. A. Stanley, New Bedford, Mass.

Second Vice-president—Henry A. Kelley, Portland, Me.

Secretary—Edgar O. Kinsman, Cambridge, Mass.

Assistant Secretary—Charles F. Krepel, Forest Hills, Mass.

Treasurer—Frederic T. Murlless, Jr., Windsor Locks, Conn.

Librarian—Charles H. Riggs, Hartford, Conn.

Editor—David Manson, Burlington, Vt.

On motion the report was accepted and the officers duly elected in accordance therewith.

Dr. JAMES McMANUS spoke with reference to a memorial to Dr. Horace Hayden that is being considered, and is to be erected at Windsor, Conn., the old home of Dr. Hayden.

Motion was made and carried that the Northeastern Dental Association contribute one hundred and fifty dollars toward erecting a memorial to Dr. Hayden.

(To be continued.)

THE DENTAL COSMOS

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Devoted to the Interests of the Profession.

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PHILADELPHIA, MAY 1909.

EDITORIAL DEPARTMENT.

THE FIFTH INTERNATIONAL DENTAL CONGRESS.

WE devote considerable space in this issue to the announcements and provisional program of the coming World's Congress of Dentistry to be held in Berlin August 23d to 28th of this year. We ask particular attention to this matter even by those of our readers who have no intention of participating in the congress, for the reason that even these preliminary notices are instructive and interesting in several important particulars.

First, one cannot fail to be impressed with the magnitude of the effort which will be brought to a successful outcome at the Berlin meeting. When it is remembered that the First International Dental Congress was held in Paris in 1889, with only four sections and a total membership of 350; that the Fourth Congress held in St. Louis in 1904 was divided into ten sections and had a total membership of 1600, and that its successor, the Berlin Congress, will divide its work among twelve sections and with a prospective membership exceeding any of its predecessors, it furnishes an encouraging demonstration of the growth and importance of dental science and art as a distinct and self-sustained

profession; it shows in a very practical way that there is a field and a demand for dentistry as dentistry, and it shows still further that the field is large enough to include all that appertains to the mouth and its related organs and tissues—in short, that the need for the stomatologist in the restricted and special sense of that term does not exist except in the minds of those who do not appreciate the meaning and possibilities of dentistry.

The sectional divisions of the Berlin Congress cover every department of dental science, art, and professional activity. Each section is officered by men who have attained eminence in their respective spheres of study, and all have been actively at work in securing for their several departments reports of the latest advancements and the co-operation of the world's specialists in making the work of the various sections an up-to-date record of the highest achievement in each.

Another feature of the plan of organization is its orderliness and completeness. The planning and effective carrying out of the details of so large and complicated an undertaking is a difficult and herculean task; to provide for all the contingencies of such a meeting can only be done where harmony of action prevails, and where intelligent guidance is characteristic of the central executive body. That these necessary conditions have prevailed in the preliminary work of the congress is evident from the published results of the work of the Committee of Organization. Not only has the serious work of the congress been logically arranged and amply provided for, but the social features, the plans for entertainment and for the physical comfort of delegates leave nothing to be desired.

We have on a previous occasion called attention to the important part which the social side of a European dental meeting plays in the success of such affairs; and in no country of Europe is this more pronounced than in Germany. It is of the very essence of a German professional meeting that it should not only be a success scientifically, but that everyone shall enjoy himself and come away with the conviction that he has had a good time. Therefore everyone who contemplates attending the Berlin Congress can be assured in advance that his visit will be a source of pleasure while it lasts and a delightful memory ever after.

We would call attention particularly to the special invitation

to American dentists from the Committee of Organization embodied in the letter of the Secretary-general printed in this issue. Let no one doubt that the invitation is a sincere expression of good-will and professional fraternalism upon the part of our German colleagues toward their American brethren. If at any time there have been differences of opinion or frictions from rivalry in individual cases, the attitude of our hosts in this instance is as expressed in their invitation—that is, the desire to give us of the best they have; and they have much to give. The congress will be held in the German parliament building, of which we print a half-tone reproduction as a frontispiece to this issue. There is no more imposing building of its kind anywhere, nor any in which such a congress could be more conveniently or comfortably held.

We therefore commend this congress to the serious consideration of all our readers, in the hope that an unusually large delegation may be induced to attend from the United States; that our country, of whose achievements in dentistry we are naturally proud, may be fairly represented, and that her share in the advancement of our profession may there be placed on record with the best that has been done elsewhere.

AN AMERICAN MILLER MEMORIAL.

As will be seen in a formal announcement which appears elsewhere in this issue, the Columbus (Ohio) Dental Society has taken the initial steps to create a suitable memorial of the late Prof. Dr. W. D. Miller, of which details will be published later.

Dr. Miller was an American, born in Ohio, and there has been gradually developing a feeling that the dental profession of his native land should unite in creating some permanent record of their appreciation of his genius and the great work he accomplished for the advancement of our profession. This suggestion, it is believed by its originators, will meet with sympathetic consideration by a large number of American dentists, and we hope, in the event that the movement is seriously projected, that it may meet with a success worthy of the man in whose memory the work is undertaken.

BIBLIOGRAPHICAL.

AN ATLAS OF SKIAGRAMS ILLUSTRATING THE DEVELOPMENT OF THE TEETH. By JOHNSON SYMINGTON, M.D., F.R.S., Professor of Anatomy, Queen's College, Belfast, and J. C. RANKIN, M.D., Royal Victoria Hospital, Belfast. London: Longmans, Green & Co., 1908.

The twelve plates which constitute this Atlas were first exhibited at the annual meeting of the British Dental Association, held in Belfast in June 1908. Although such an excellent collection of skiagrams already existed as Karl Witzel's "Development of the Human Maxillary Bones and Teeth," published by the Central Office of Dental Hygiene, Berlin and Dresden, 1907, which in seventy-five radiographs illustrates the dental and maxillary development from the fetus to old age, the authors have by a well-studied technique succeeded in securing without any retouching, but apparently with the aid of some clever etching, a series of such beautiful skiagraphs as have hitherto never been equaled. The authors have to a great extent overcome the difficulties which the confusing shadows of the teeth and bones from the opposite side of the jaws ordinarily present where skiagrams are used in diagnosis. The skulls were divided vertically in the median line, and the soft parts, with the exception of the gums, removed. To avoid a confused image from the shadows of the incisor teeth overlapping, the specimens were laid upon the plate and tilted to an angle

of about thirty degrees above the horizontal. This was found to give an absolutely clear image in the molar and bicuspid regions, and much less interference with those of the incisors. Naturally, however, it has been impossible to get rid of this defect entirely, and although the plates are very instructive for all teeth from and including the canine backward, they do not render with any such distinctness the details of the central and lateral incisors. The photographs were taken from the jaws of eighteen children whose ages ranged from birth to sixteen years, and from one adult, so that practically a complete history of the calcification of each tooth is recorded.

The method by which these masterpieces of the art of skiagraphy were obtained, unfortunately also limits the usefulness of the book; for the conditions under which a skiagram must be obtained in a living case are much more complicated, and do not allow of such preparations as the authors have employed in order to obtain the best possible results. Moreover, it is the pathological conditions and their appearance on the plate that are of prime importance for the dental surgeon. But in spite of these shortcomings, the skiagraphs, together with the descriptive text and drawings, will be of great utility in giving the student an understanding of the normal anatomical conditions as portrayed in the skiagram, thus preparing him for a better understanding of pathological aspects in elucidating for him certain points in

the eruption of the teeth and the formation of the jaws, and in guiding the inexperienced practitioner in the correct interpretation of skiagrams.

COMPENDIUM AND ATLAS OF DENTISTRY, INCLUDING THE ORAL DISEASES. By GUSTAV PREISWERK, Ph.D., M.D., Lecturer at the University of Bâle. Second Edition. (Volume XXX of Lehmann's Medical Hand Atlases.) Munich: J. F. Lehmann, 1908.

Within a very few years, a second edition of this compendium has become necessary, showing that it has supplied a strongly felt need in dental literature. The material has been considerably increased and a great number of excellent illustrations have been added, which as far as artistic finish and careful selection are concerned may be called exemplary. The publishers' principle to profusely illustrate the text is especially appreciated in a dental text-book. The title would indicate the book to be specifically a book on dentistry, yet owing to limitation of space, neither operative nor prosthetic dentistry is considered. This naturally limits the usefulness of the book to the class of reference books that are very valuable for the experienced dentist and the uninformed medical practitioner, but not for the student, who must acquire a systematic knowledge of the subject. The author writes in an easy yet thorough style, and while giving due consideration to the historical development, does not omit any of the latest investigations and achievements, giving a good testimony of his careful and extensive reading. The anatomy, embryology, histology, physiology, and bacteriology of the mouth and the sinuses in its neighborhood are reviewed, the

pathology is fully gone into, and the fractures and dislocations of the maxillæ and teeth are spoken of, together with trigeminal neuralgia and empyema of the antrum of Highmore. Separate chapters treat the dental and maxillary anomalies, caries of the teeth, its effects and prophylaxis, the pathology, diagnosis, and treatment of affections of the dental pulp, and periodontitis. The diseases of the mouth proper are considered in fifteen sub-headings. Stomatitis, its constitutional nature and the logical deduction for treatment, has received perhaps too scant discussion. On the other hand, in the chapter on pyorrhea alveolaris, thirty authors are cited in regard to the treatment of this disease, the author distinguishing between pyorrhea of constitutional and of local character, the former constituting one of the main symptoms of gout, diabetes, tabes, or toxemia, the latter being due to deposits on the teeth and disturbed articulation, both causative factors often being combined, and requiring treatment accordingly. In the chapters on difficult eruption of the deciduous teeth and on empyema of the antrum of Highmore, the author advances views which are not generally and unquestionably accepted, also the chapter on fractures might contain more detail, especially in regard to the many and better forms of apparatus than those mentioned. In his notes on experimental softening of hard tooth-substance by trypsin and trypsin-forming bacteria, which have been partly indorsed by the recent histological investigations of Fischer and Landois, the author opens up a new field for important investigations. The book in its entirety deserves high praise.

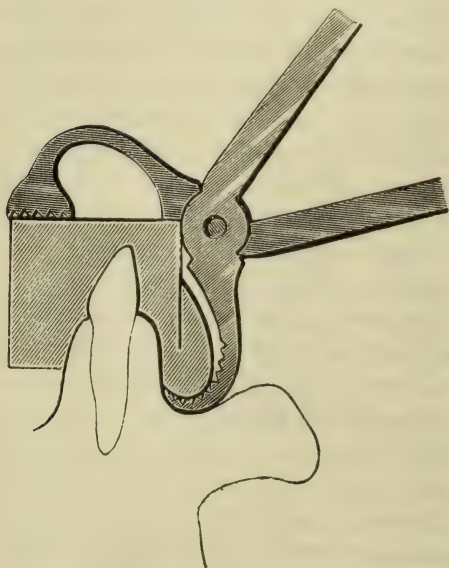
R. H. R.

REVIEW OF CURRENT DENTAL LITERATURE.

[*Ash's Wiener Vierteljahrs-Fachblatt*, Vienna, November 1908.]

ON THE TECHNIQUE OF PLASTER IMPRESSIONS. BY DR. E. SCHNOELL.

The technique of plaster impressions, although apparently simple enough, offers sufficient difficulties to warrant a few suggestions. The selection of a correct tray will be facilitated by the use of measuring calipers.



The depth of the tray is determined by measuring the distance from the point of the gums to which the plate is to reach to the median line. In the upper jaw the ends of the calipers are laid on the buccal walls of the molars, in the lower jaw the transverse distance between the lingual walls of the teeth is measured, allowing an additional space of six millimeters to the walls of the tray. This takes less time and is more agreeable to the patient than the trying in of two or three trays. In lower trays it is advisable to replace the metal wall in the region of the

frenum by a wall of wax, in order to secure a larger surface and to avoid the tipping over of the plaster. Carious teeth are filled, if only with wax, before taking the impression. The theory that the hardened cast will break at the grooves cut into it is not borne out by experience. A skilled operator will generally produce a large first piece with his thumb and the point of his index finger, the line of juncture between these fingers going diagonally through the portion of greatest weakness, that is, the mass of the teeth. This leverage action of the fingers is reproduced in a sort of tongs which the author has constructed. (See figure.) By applying the force of leverage in the form of a gently rocking motion, a very large first piece can be secured.

[*Bulletin du Syndicat des Chirurgiens-Dentistes de France*, Paris, November 1908.]

THE UTILITY OF RADIOGRAPHY IN ORTHODONTIA. BY DR. DUCOURNEAU.

The use of radiography in medicine, surgery, and dentistry is too well established to need any further comment. The author cites, however, two cases of regulation which seem of interest. The first case presented an anomaly of number with a slight lateral deformation of the left maxilla due to the presence of a supernumerary tooth. The maxilla of the eleven-year-old patient presented two lateral incisors. From a morphologic point of view these two incisors showed no difference in regard to the crown. They had erupted simultaneously and unnoticed by the patient and his family. Both teeth exactly resembling the upper right lateral incisor, it could not be determined whether the supernumerary tooth had been formed at the expense of the central incisor or of the canine. It owed its origin either to a duplication of the follicle of the permanent lateral incisor or to the proliferation of a second germ issued from the same epithelial cord, which must have taken place during intra-uterine life. Owing to the slight

deformation of the left maxilla, the canine appeared between the second lateral incisor and the first bicuspid, outside of the arch. In order to make room for it, the extraction of one of the two lateral incisors was indicated, it being uncertain, however, what the relations of these teeth to each other were. The radiograph showed that the two teeth were independent of each other and that their roots were almost alike, that of the second tooth being slightly curved. This tooth was extracted, securing ample space for a rapid and normal eruption of the canine.

The second case was that of a fourteen-year-old boy with a very narrow maxilla, which presented two voluminous lateral incisors, no canine, one bicuspid, the first molars, but no second molar, making a total of eight teeth. The narrowness and pointed form of the arch imparting a very unesthetic appearance to the patient's face, it was desirable to correct the maxilla, the *modus operandi* to be determined by the presence or absence of the follicles of the teeth which were to fill the arch. The radiograph showed a very deeply inclosed canine pointing toward its normal position, the follicle of the second bicuspid encroaching upon the first molar. The follicle of the second molar also appeared in normal position. On the basis of this diagnosis, the spreading of the arch and the directing of the teeth into their proper places was carried out according to approved methods. The author's observations warrant another plea for the general adoption of radiography in orthodontia.

[*Schweizerische Vierteljahrsschrift für Zahnheilkunde*, No. 4, Zurich, 1908.]

ON THE DISCOLORATION OF SILICATE CEMENTS. BY C. STRUEMPPELL, Hamburg.

Instigated by a practical case of discoloration of two silicate cement fillings which occurred after the patient had eaten huckleberries, the author made a series of experiments with artificial discoloration in fillings of the latest Harvardid, Ascher, Amamant, Schoenebeck, Phenakit, and Silicin, which yielded the following results:

Test 1. One molar was filled with Harvardid, another with Ascher. After correct manipulating and hardening, the filling was painted with boiled elderberry juice, and after a minute washed with water and saliva. The Harvardid filling immediately resumed

its original color owing to the alkalinity of the saliva, while the Ascher material showed a muddy gray color one hour after the application of the coloring matter.

Test 2. A canine was filled mesially with Amamant, distally with Schoenebeck, and after hardening the fillings were colored with elderberry juice. The discoloration could not be removed by the saliva and was still visible after twenty-four hours, when it was polished off.

Test 3. Phenakit gave the same results as obtained in test 2, Silicin the same as Ascher in test 1. Experiments with other coloring matters proved Ascher and Harvardid to be the better; of these two preparations, Harvardid merited the decided preference.

The second series of experiments was made outside of the mouth. The cements were all correctly manipulated and allowed to harden for the same period of time. To reproduce nature as nearly as possible, the fillings, fifteen minutes after their insertion, were covered at 37° C. with varnish, then kept in the mouth for some time and dropped into the coloring solution, the results being the following:

Test 1. The filled teeth were laid into a weak solution of anilin red for several days. Harvardid showed externally a slightly rose discoloration, internally none; Ascher and Silicin were externally slightly rose tinted, internally slightly discolored; Amamant, Schoenebeck, and Phenakit showed externally and internally more or less rose discoloration. In trying to remove the discoloration with brush and tooth-powder, the color disappeared from Harvardid on mere rubbing with the fingers, the other preparations retained the stain.

Test 2. The fillings after having been allowed to harden for thirty minutes, three hours, and twenty-four hours, were thrown into a solution of anilin blue, the results being uniform discoloration in Harvardid and Ascher after these different periods of hardening. Amamant was most discolored after thirty minutes, less so after three hours, and least so after twenty-four hours of hardening. Schoenebeck was discolored after thirty minutes, more so after three hours, most so after twenty-four hours, that is to say, in the opposite way to Amamant. Phenakit behaved like Amamant, Silicin like Ascher.

Test 3. The filled teeth were laid in a

solution of methylene blue. The second day it was seen that the coloring liquid in some of the test tubes had assumed a more or less lighter color or had lost its color entirely, showing that the coloring agent had been absorbed by the cement; only in the tube containing the Harvardid filling no discoloration of the liquid was noticeable. The Harvardid filling itself showed a light greenish blue color, Ascher a deep blue, Amamant, Schoenebeck, and Phenakit a black blue, Silicin a deep blue shade. The light greenish blue coloring of the Harvardid was fairly easily removed with tooth-powder and brush, while the other preparations could not be freed of the discoloration.

Test 4. The fillings were laid in unboiled huckleberry juice. The results were very different: In Harvardid there was a grayish purple discoloration on the surface, internally none; Ascher was on the surface dark gray, internally gray; Amamant on the surface black blue, internally gray blue, moreover completely burst; Phenakit was black blue throughout and considerably checked; Silicin behaved like Ascher.

Test 5. The fillings were laid in boiled huckleberry juice. Harvardid showed a muddy gray discoloration, Ascher a bluish gray one; the discolored layer could easily be separated from the bulk, showing that the coloring matter forms a protecting cover over the filling; Amamant was discolored black blue, Schoenebeck and Phenakit black, Silicin ultramarine blue.

Test 6. The fillings were laid in cochineal dye. Harvardid was discolored externally, but unchanged internally; Ascher externally rose, internally slightly permeated; Amamant externally rose, internally permeated but not entirely, Schoenebeck externally slightly rose, internally little permeated; Phenakit externally lilac, also discolored internally; Silicin behaved like Ascher. Again the coloring matter could be removed from the Harvardid by means of brush and powder. In all the other preparations the coloring matter had entered the body of the filling. In many other coloring tests undertaken with red wine, colored dentifrices, etc., the new Harvardid best stood the test. All Harvardid fillings have a natural luster, which is missing in all the others excepting some Ascher fillings. Besides these advantages Harvardid is free from arsenic, which cannot be said

of any of the other preparations, not excepting Ascher, which despite the evasive and vague statements of its advertisers contains 3 per cent. or less of arsenic. This varying percentage of arsenic in Ascher's cement also explains the different results obtained from its use. In the acid tests, which were carried out under most natural conditions and with the aid of a thermostat one hour after drying, the figures of loss in lactic acid were well-nigh the same for Silicin, Ascher, Harvardid, Astral, and Schoenebeck. Phenakit behaved so badly that one could hardly speak of a loss. The foregoing tests allow of rather definite conclusions as to the choice of silicate cements as a universal filling material.

[*Kronika Dentystyczna*, Warsaw, February 1909.]

A CASE OF CUTANEOUS ERUPTION IN A CHILD AFTER DEVITALIZATION OF A PULP. BY DR. ASTACHOW.

The author publishes this exceedingly rare case in order to show that the secondary effect of some medicaments as observed in general therapeutics may also be noted in dentistry. It has long been known that certain diseases, such as diabetes, exert a very detrimental influence on the oral organs, especially the teeth. This is among others a very strong reason why the dentist should be thoroughly familiar with the principles of odontology and stomatology in their relationship to the general organism. In treating several carious teeth the dentist seldom hesitates to devitalize three or more pulps by means of arsenous acid, which owing to the dilatation of the vessels in the inflamed pulp reaches the general circulation. In the case referred to only one tooth was devitalized, whereby only a very small quantity of the arsenic could possibly reach the circulation. The author inserted arsenous paste in the deciduous molar of a boy of seven and one-half years of age, amputating the pulp two days afterward. The chamber was filled with a mixture of xeroform, thymol, eugenol, and zinc oxid. The next day the patient was reported to exhibit a strange eruption on the chest and abdomen, the etiology or pathogenesis of which was inexplicable to a specialist on children's diseases. Three days afterward the same specialist, owing to a total absence of increase in temperature or of any other disturbance of the alimentary

and digestive tract, attributed the toxic phenomenon to the arsenic, which diagnosis appeared all the more correct as the child had taken no medicine whatever either before or after the application of the arsenic. In spite of the removal of the pulp, the eruption extended over the neck and the hips of the patient, assuming a still deeper color. As a precaution the xeroform paste was removed from the pulp-chamber, which was subsequently filled with cotton saturated with absolute alcohol and sealed in with Fletcher's cement. About two days after this operation, the intensely red eczema began to attenuate and disappeared after a week. The tooth was afterward filled. The author feels induced to attribute the eczema to the secondary effect of the arsenous paste, owing to the following considerations: First, the eczema appeared after the insertion of the arsenous paste in the pulp-chamber and two days before that of the xeroform-thymol-eugenol-oxid of zinc. Second, the resorption of the arsenic by the organism took place so slowly that the gradual expansion of the eczema after the amputation of the pulp does not contradict the assumption that the arsenous acid was the cause of the eczema. Third, in children up to twelve years of age a skin eruption is sometimes noticed after the internal use of arsenous preparations such as Fowler's solution. The arsenous acid must have reached the circulation by way of the bloodvessels of the vital pulp, since the xeroform paste had been laid over the cicatrix of the amputated pulp, consequently being unable to reach the circulation. Fourth, the eczema showed a strange discoloration such as has been described by Devergie in *Bulletin Général de Thérapie* in 1869, which is especially characteristic of cutaneous eruptions of arsenous origin. This case very well illustrates the secondary effect which medicaments introduced into the pulp-chamber may exert on the general system.

[*Tijdschrift voor Tandheelkunde*, Utrecht, January 15, 1909.]

THE SIGNIFICANCE OF FERMENTS IN DENTAL DISEASES. BY DR. ALFRED KANTOROWICZ.

After dwelling at some length on the influence of ferments on the human system and its defensive forces, the author reports a series of exceedingly interesting experiments

on the influence of ferments on the dental pulp. The sound pulp undergoes no alteration, while a pulp affected with partial pulpitis is degenerated only in that portion where ferment is produced, the remaining portion being sound and containing no free ferment. An abscessed pulp presents ferment everywhere and is degenerated entirely. While far from denying that bacteria by attracting the leucocytes by their products of metabolism are instrumental in causing inflammation, the author maintains that the dissolution of the pulp is not due to the bacteria but to the leucocytes. In order to prove this, he made bouillon cultures of bacteria occurring in pulp, in which he laid sound sterilized pulps. After from two to four weeks these pulps were as intact as they had been originally, and showed no trace of dissolution. If, on the other hand, sound pulps or other fibrous tissues are laid in leucocytic ferments, they appear entirely decayed after twenty-four hours, while after forty-eight hours they have disappeared, leaving only some slimy detritus. It is the leucocytic ferment, then, that dissolves the pulp. It can also be proved that the number of leucocytes contained in a pulp suffices to produce the necessary amount of ferment. If an inflamed pulp is washed out in order to remove the serum, it will fall victim to autolysis, destroying itself. In these experiments the destruction of the pulp takes place with exceeding rapidity, while in the tooth this process of destruction is extremely slow. This is explained by the absence of the anti-ferment, the conservative factor, in the experiments. The mother organ aids the threatened cells by a supply of antiferments, failing in this protecting effort as soon as thrombosis of the injured vessels takes place. The supply of juices by way of diffusion is not sufficient to chemically bind the ferment. This vital process may be reproduced by way of experiment. If one pulp is bathed in serum, and another with table salt, the antiferment in the former will prevent autolysis.

In dental caries the process is briefly the following: The calcium salts are dissolved by lactic acid, the dental cartilage remaining, replete with bacteria of all sorts. These bacteria have a strongly proteolytic effect; they produce ferments, the dissolution of the cartilage being due to these ferments, and dis-

solve the albumin which is diffused in their membranes. This also explains why the truly pathogenic microbes, the streptococci, staphylococci, etc., do not need to produce proteolytic ferments, since they are so well fitted for parasitic life that they always find enough dissolved albumin in the organism of their host. Not so the caries-producing bacteria, which have to prepare the soil on which they live by producing the necessary ferment.

In periostitis, also, the large amount of ferments present in inflamed granulomata is easily recognized. The bacteria do not destroy the tissues, but the leucocytes, whose friendly aid is more destructive than the enemy's onset. This condition is apt to almost overthrow our conceptions of the rational process of systemic reactions. Yet, although pus is necessary in order to bring about the dissolution and resorption of degenerated tissue, on the other hand a surplus is detrimental to normal tissue. Pus issuing continually from fistulæ injures even the cutis, and in phlegmonous inflammations dissolves and destroys the sinews. A proof of the deleterious effect of too much pus has been furnished by Mueller and Peiser, who after emptying abscesses by puncture inject into them serum or hydrocele fluid or that from ascites, thereby effecting a cure of the abscesses without incision. In other cases, as in tuberculous abscess, a want of ferment is undesirable. In such cases the leucocytes may be attracted by injections of iodoform by way of chemotaxis, or trypsin may be injected directly into the abscess in order to bring about the absorption of the cheesy masses.

A third possible method of ferment treatment would consist in increasing the general antiferment content by immunizing the system, a method which has been practically demonstrated in animals by Sochmann and the author. For dentists the antiferment treatment in pulpitis is of small value, for ferment and antiferment must be in direct contact in order to neutralize each other. The opening of the pulp-chamber in cases in which conservation of the pulp is indicated is far too small to allow of an effective treatment of the inflamed tissue. It would be too painful to save the pulp by injecting into the inflamed tissue, and would involve too many dangers on account of bacteria being possibly forced through the apical foramen. Only in

parulis is the antiferment treatment indicated. The author has treated several cases of dental abscess by incision and drainage of the pus, by injections of antiferment into the abscess cavity and by insertion of a tampon saturated with antiferment. The flow of pus ceased immediately, and the swelling quickly subsided. Antiferment may be secured from hospitals in the form of hydrocele or ascites fluid. To this 5 per cent. of carbolic acid is added so as to make a 0.5 per cent. solution of carbolic acid, that is to say, the 5 per cent. carbolic acid solution is diluted with 10 parts of serum, which will give a sterile and stable solution. The antiferment treatment of periosteal abscesses of dental origin is warmly recommended.

Ferments are unsuitable for the devitalization of the pulp, since the serum contains antiferments for every ferment, which theoretically explains why the experiments with devitalizing by means of pepsin have failed.

Dr. Kantorowicz believes that he has sufficiently proved the important rôle played by the leucocytic ferments in destroying tissue, and seems to have started on the road toward a rational therapy of purulent conditions, which in regard to their causes have heretofore been treated only by bactericidal methods.

[*L'Odontologie*, Paris, February 15, 1909.]

CRESYL-FORMO-THYMOL IN THE TREATMENT OF CARIES OF THE THIRD AND FOURTH DEGREE. By V. E. MIÉGEVILLE.

Among the numerous preparations utilized in the treatment of caries of the fourth degree, those containing a basis of formol are the most efficacious. The commercial solution of formic aldehyd of 40 per cent. is very strongly antiseptic, even more so than corrosive sublimate, according to Trillat. 25 centigrammes, that is to say about 5 drops of a 40 per cent. solution of the commercial drug, will sterilize one liter of culture-broth crowded with microbes, even pathological ones. In the gaseous state, formaldehyd is the most energetic of known antiseptic agents. For efficient sterilization, however, the formol or its vapors must be in direct contact with every portion of the object to be sterilized. Since formol cannot be employed in dentistry in a gaseous state, and since a commercial aqueous solution of 40 per cent. formol lacks in diffusibility owing to its slight volatility, the author has conceived the fol-

lowing preparation: A flask half filled with methylic alcohol is heated in a water-bath, the alcohol evaporates, and mixed with plenty of air passes along a copper tube which contains coke heated to redness, without ever being carried to the point of incandescence, in order to avoid the production of carbonic acid. Formic aldehyd vapor mixed with that of methylic alcohol undecomposed passes off, to become condensed in a U-shaped tube of large caliber filled one-quarter full of essence of thyme containing 50 per cent. of thymol. The tube is submerged in a receiver full of water, which is kept at sufficiently low temperature by means of ice or running water.

The operation is stopped when the volume is augmented by 50 per cent.; at that moment the U-shaped tube can be replaced by a new one. A small measuring bottle completes the apparatus. The essence of thymol saturates itself with formic aldehyd mixed with methylic alcohol. Tricresol 20 per cent. is added, which represents a mixture of the three cresols in about the proportion of 25 paracresol, 35 orthocresol and 40 metacresol. This tricresol is added in order to considerably augment the antiseptic power of the constituents, at the same time preserving their properties. The product thus obtained, cresyl-formo-thymol, is absolutely anhydrous, unalterable, very limpid, and possesses considerable microbicidal power. Numerous practical experiments extending over five years have proved cresyl-formo-thymol to be of excellent service in dental practice. It is employed on twist-drills in cases of caries of the fourth degree, even the most highly infected, after mechanical cleaning, washing, and complete drying of the cavity. Its use can also be extended with advantage to the making of an antiseptic paste for use under permanent fillings, in filling canals and pulp-chambers in cases of the fourth degree. The following formula for this paste gives good results, and forms an excellent substitute for iodoform paste with its disagreeable odor:

Formo-thymol,	1 to 4 drops;
Oxid of zinc,	
Eugenol,	āā q. s. to make a firm paste.

Cresyl-formo-thymol, notwithstanding its antiseptic power and its great diffusibility, does not cause alveolo-dental inflammation; it rapidly permeates the root-canals, impreg-

nates the dry dentin and renders it sterile, at the same time speedily destroying the infective agents present.

[*La Odontología Mexicana*, Mexico, January 1909.]

OBSERVATIONS ON PYORRHEA ALVEOLARIS. BY DR. RICARDO FIGUEROA.

A new publication has appeared in dental journalism, which despite its modest appearance promises to do justice to the advance of dentistry made in Mexico within the last decades. We take pleasure in introducing this Spanish publication, *La Odontología Mexicana*, an illustrated monthly review of dental science, art, and literature, which under the able editorship of Dr. José J. Rojo, Professor of the National Committee on Dental Education of Mexico, bids fair to furnish valuable contributions to dental science.

One of the sponsors of this publication, Dr. Figueroa, Professor of Dental Surgery of the National Committee on Dental Education, introduces himself with some observations on that ever-puzzling problem of pyorrhea alveolaris, confining himself to a description of cases of local and mechanical origin and physiological alterations. In the first case the alveolar pyorrhea extended from the left lower canine to the right central incisor, there being abundant pus and the teeth beginning to move in their alveoli. Minute examination showed that two antagonistic teeth had been accidentally lost whereby the articulation had been deprived of its respective supports, the lower left central incisor striking with its distal surface its upper antagonist, owing to a rotative movement, and consequently being exposed to a double stress in the act of mastication. Treatment in this case of purely local causation consisted in first combating the existing infection, in moving the lower left incisor to its proper position of articulation, in replacing the lost teeth by a prosthetic piece, and in thus regulating and balancing the stress of mastication.

Another case treated with satisfactory results was that of a girl of thirteen, who presented in both jaws irregularities of anteversion and retroversion, with a pyorrhea extending to the first bicuspids. The lower central incisors struck with their incisal edges the upper ones, exerting upon them a heavy leverage. The lower canine and lateral

showed retroversion and were being struck in the second third of their labial surfaces by the incisal edges of the upper central incisors and lateral, thereby maintaining a constant irritation, which was favored by an accumulation of tartar on all the teeth. The teeth were very loose in their sockets. The treatment consisted in complete removal of the tartar, application of antiseptics, and regulation.

A third case was that of a youth of fourteen or fifteen years of age, with a pyorrhea extending from the upper right lateral to the first molar. A close examination revealed a very pronounced irregularity of the incisors and canines on the right side, their incisal edges striking very forcibly, owing to the general deficiency in occlusion. The lower teeth had a marked tendency to anteversion, exercising a heavy stress on the upper ones. Treatment consisted in a careful cleaning of the teeth, in maintaining the oral cavity in a perfect hygienic condition, and in regulating the teeth by means of regulating devices.

The author concludes that pyorrhea cases that have resisted all medical treatment will yield to orthodontic treatment.

[*Svensk Tandläkare Tidskrift*, Stockholm.
No. 4, 1908.]

DOES THE FOURTH MOLAR INDICATE PROGRESSIVE DEVELOPMENT OR ATAVISM? BY ALBIN LENHARDTSON.

The fourth molar is found exceedingly rarely in civilized races at the present time, but very commonly in the lower races, such as negroes and Australians. The interest attached to that tooth culminates in the question whether it indicates a progressive development or whether it signifies atavism, that is, an inheritance from may-be very distant ancestors. In the first case one would justly expect an increase in the number of teeth, in the second case the fourth molar must have been eliminated from the jaw in accordance with the same law of nature that has brought about the reduction of the third molar. Professor Leche considers the dental system to be an irrefutable example of pure progressive development. During the period of the development of the teeth greater or smaller remainders of the dental germs are preserved for some time, offering the possibility of new tooth-development even in older individuals. Generally these potential germs are dissolved

before they mature. If the conditions for the development of such supernumerary teeth are favorable, if the increase in the number of the teeth is useful to the individual, if there is enough room in the jaw and if the conditions of nutrition are good, there is no reason why such supernumerary teeth should not be developed beside the normal ones. Such supernumerary teeth occur in several mammals in such normal shape that we are entitled to consider them as neoformations. This theory is borne out by observations on the orang-outan and the gorilla, in which the third molar, unlike that of man, is especially fully developed, and which very frequently present a fourth molar. Selenka found even a fifth molar in an orang-outan, all of which proves that the fourth molar forms a link in the process tending toward an enlargement and reinforcement of the entire masticating apparatus. Although this seems to speak in favor of Leche's theory, some weighty arguments can be cited against his idea of pure progressive development. The original type of mammal from which man has descended possessed forty-four teeth. In the course of probably millions of years man has lost one incisor, one bicuspid, and one molar on either side in both jaws. This reduction in the number of teeth is, however, not characteristic of man only. In the genus *Felis* for instance, the original number of forty-six teeth has been reduced to thirty. This reduction in numbers goes hand in hand with a complication and specialization of the teeth. The face, and especially the oral portions, have been changed in the higher races of modern time from original prognathism to pronounced orthognathism, as the finds of diluvial skulls convincingly prove. The lower races of our age such as negroes, Australians, etc., still show pronounced prognathism.

The cause for the orthognathism in man must be sought in the influence which the muscles employed in chewing exert upon the jaw and the skull. The chewing of hard, tough, resistant food engages the jaws, teeth, and muscles quite differently from the chewing of soft, already prepared food. A more profuse supply of blood and consequently stronger and larger jaws, teeth and muscles are the result. Stronger muscles however require larger areas for attachment. The masseter-temporalis group is therefore very strongly developed in carnivorous beings,

owing to the rather vertical movement in cutting meat, while in herbivorous beings the pterygoideus group, especially the pterygoideus externus, is more strongly developed owing to a lateral grinding movement. In the higher, omnivorous races the pterygoideus group is the more marked. The less the chewing muscles are used the weaker they become, and the smaller areas they require for their attachments. The brain then develops at the expense of the facial bones, which become smaller and shorter. This is strikingly observed in the higher races, in whom the line of force of the masseter-temporalis group does not exceed the first molar, which indicates the great importance of that tooth. According to Topinard, the molars in the higher races decrease in volume from the first to the third, while in negroes and anthropoids the opposite is the case. The canine or "preying tooth" in our ancestors was developed in such a way as to serve as a weapon of attack and defense, which strongly tended to producing prognathism. Another cause for prognathism, as has been demonstrated by Von Nathusius' experiments with animals, lies in in-breeding, which produces smaller skulls, longer jaws and longer rows of teeth. Since our ancestors lived in small tribes for long periods, the necessary in-breeding brought about prognathism and a greater number of teeth.

Whatever the causes for prognathism may be, a comparison of the masticating apparatus of the higher races with that of diluvial man and of the lower races shows that our jaws and teeth have undergone a retrogressive change and still continue to do so. This process may be shortly explained as follows: An organ in the adult undergoes a variation from some cause—if the struggle for existence demands a strengthening, the development is progressive; if on the other hand the function of an organ is of smaller value or becomes superfluous, a retrogressive development takes place. The sum of these tendencies to variation are sooner or later transmitted to the germ plasma, and become hereditary. The organ appears then more or less imperfectly developed in a certain percentage of individuals, and finally disappears entirely.

The fourth molar then according to the author indicates atavism. While fairly frequently observed in apes, it is rare in man,

De Terra citing forty cases chiefly observed in the lower races, and only three in higher races. In eight of these cases the fourth molar was well developed, in all the others it appeared to be more or less reduced. It is noted as frequently on both sides in the maxilla as on one side, very rarely in the mandible; the simultaneous occurrence of all four molars is very unusual.

In concluding, Dr. Lenhardtson says: The original family of mammals from which man has descended possessed four molars. The fact that ancestors of anthropoids or man with fourth molars cannot be demonstrated is of no decisive significance. The paleontological material is too scant. Man in his development must have lost the fourth molar at an earlier stage than the ape, for the earlier an organ has disappeared the more rarely it occurs by way of atavism. A progressive development in the fourth molar in man would contradict his entire phylogenetic development. The third molar and the second incisor bear clear traces of reduction, even in lower races. Solbrig in 1400 negro skulls found about 510 third molars to be missing. Even in the anthropoids symptoms of reduction may be noted; Röse reports that in the species *Gibbon* the third molar is frequently missing. All these observations seem to indicate a retrogressive development. The brain portion is more and more fully developed, the facial portion is reduced proportionately. Even the second molar sometimes exhibits three tubercles instead of four or five. Some anatomists even claim that the second bicuspid will be replaced by a persistence of the second deciduous molar. Since the first dentition is the original and primitive one, the conjecture may be raised, whether in time the retrogressive changes may not assume such proportions that all present molars will disappear, and the deciduous teeth together with the bicuspid changed into serviceable molars will persist.

[*Revue Trimestrielle Belge de Stomatologie*,
Bruges, December 1908.]

A METHOD OF ANESTHETIZING THE DENTAL PULP. BY A. VANMOSUENCK.

The method advocated by the author consists in employing a solution of one centigram of cocain together with one drop of hydrochlorate of adrenalin, in one cubic centimeter

of aqua destillata. This weak solution has been almost always found to be efficacious, and involves none of the inconveniences, syncope, etc., connected with the use of cocaine. Since considerable pressure is to be exerted, a solid, tight syringe is required. The place of injection is the interdental space, where the needle can be most easily introduced nearest to the apex. The needle glides along the root as far as possible, until it is firmly lodged between the two osseous planes, and considerable resistance to the injection of the liquid is felt. On account of the limited space into which the liquid must penetrate, the injection is made very slowly. Its successful penetration is indicated by the appearance of a whitish zone at the level of the interdental space. A few minutes after the injection, anesthesia is complete and generally lasts over fifteen minutes, which gives the operator time to painlessly extirpate the pulp.

For sensitive dentin in superficial cavities in the region of the cervical edge the author

recommends erythrophlein, mixed with equal parts of eugenol; this is inserted into the cavity, which has been previously dehydrated, on a minute piece of cotton, and sealed in with gutta-percha or cement. The cotton is left in the cavity for twenty-four to forty-eight hours. The drug possesses a very intense vaso-constrictor action upon the vessels of the pulp, which produces total anemia and subsequent anesthesia of the pulp.

While realizing the dangers involved in the application of cocaine in the proximity of the pulp, which might produce an acute pulpitis, the author recommends the above method in caries of the third degree. Only in persons of about forty years of age, in whom the teeth are short and very firmly implanted, the pulp was found to retain its vitality after the injection.

The hemorrhage following the extraction of the pulp is stopped by firmly packing in the root-canal a cotton fiber, which if necessary may be saturated with trichloroacetic acid.

PERISCOPE.

Iodin Spots.—To remove iodine spots from the hands, a solution of potassium iodide or sodium bisulfite or hyposulfite is applied on a tampon of absorbent cotton. Make several applications if necessary. The above solutions will also remove spots from cloth.—*Journal Odontologique de Paris.*

Disinfection of the Mouth.—In the attempt to aid the natural resources of the tissues in the elimination of infectious material by mouth cleansing or disinfection there are several factors which render the problem both serious and difficult. The mucus which protects the mucous membrane from bacteria also protects the bacteria from the action of foreign substances. The removal of mucus exposes the mucous membrane to more or less irritation, which may be accompanied by exudation, development of the bacteria in the secretions within, increase of virulence, and possible infection.

Many antiseptics are irritants, and in the mouth are of doubtful value. Solutions to be used in the mouth should be selected with care and should possess certain essential qualities.

In general they should be bland to the mucous membrane, diffuse quickly with the secretions, and if antiseptic should be of known practical value.

Most observers in recent years advise approximately neutral reactions for mouth-washes. Acids have been used. Bacteria in the fermentation of sugars form acid rapidly, and when certain percentages are reached growth stops and some species of bacteria die rapidly. On the other hand, Miller has shown caries of the teeth to be due largely to the acid fermentation of sugars in the mouth by bacteria, and it is now deemed better to neutralize whatever acid may be present rather than to introduce any more. Alkalis have been recommended chiefly on account of the more rapid diffusion with the secretions, but they have little or no action on the bacteria in strength which can be used with comfort in the mouth. To the gums and teeth they are generally considered as injurious. The reaction of solutions to be used in the mouth should therefore be neutral or preferably slightly alkaline to neutralize whatever acid may be present.—K. E. HATCH, *Dental Digest*.

Convenient Broaches.—Instead of using a small handle, old instruments of different angles may be successfully soldered on with soft solder. Such instruments are always at hand, and can be easily applied and disinfected.—W. M. COOPER, *Dental Review*.

Enlarging Root-canals with Broaches.—I have almost given up enlarging root-canals with broaches, having found difficulty in knowing how far to go. The great difficulty is presented by the fact that with the broach there would be a little bur or shoulder passed which one would not be able to penetrate, thereby losing track of the depth of the root-canal.—CHARLES MONK, *Dental Review*.

Treatment of Suppurative Inflammations.—In the suppurative or slow process of inflammation and pus formation, involving the bony structures, with the tendency of localized infection of certain cancellated bony structures, a mixture of equal parts of sulfuric acid and phenol is absolutely unequaled in its effects. It has a stimulating effect on the tissue cells; it is a destructive agent to all forms of bacteria; it has a tendency to penetrate the bony structure, in which there may be secreted large numbers of bacteria, and in this way it is one of the most potent agents in the treatment of this class of suppurative inflammation.

There are a number of agents which have practically the same potent properties that these agents just mentioned have, but their source of efficiency comes largely from the so-called cresols. Lysol is one of them, but it is not as efficient as cresol alone. It is, however, important to note that in those conditions where chinol cannot be used, lysol may be employed to advantage.—GEORGE W. COOK, *Dental Digest*.

Disinfection of Dentin in Large Fillings.—Is it necessary or best to disinfect the dentin in all large fillings in vital teeth, or will the bacteria be destroyed by hermetically filling the teeth? I think it is always best to disinfect. It may be a fact that the hermetic sealing of the cavity will prevent the growth of bacteria, but how many cavities are so sealed? Even if it were a fact that hermetically sealed cavities will prevent the growth of bacteria, we must disinfect all cavities, and I do not think that such disinfection means flooding it with alcohol, etc. If we wish to disinfect a cavity, we should adjust the rubber dam and seal in the disinfectant for about twenty-four hours. The remedy which I use is modified phenol, which is composed of menthol, thymol, and phenol,

the menthol having an anodyne effect, and the thymol being penetrating and also disinfectant. If we, however, expect to fill at once, then we should use a stronger disinfectant, a weak solution of mercury bichlorid or a weak solution of formalin. If we are to fill the cavity at once, we need something stronger than the ordinary antiseptics so commonly used for flooding cavities. We should disinfect at all events, whether we feel that the hermetically sealed cavity is going to destroy the growth of bacteria or not. There is a general tendency toward preparing the cavity too hastily and to filling too quickly. If it appears that the discoloration has gone beyond a point where we can mechanically disinfect, we should seal the disinfectant in for some time, and not rely on hermetically sealing the cavity in order to destroy the bacteria.—E. W. ELLIOTT, *Dental Review*.

A Method of Accurately Fitting Shell Crowns.—To make a perfect crown we must know not only the exact length, but also the exact shape of the circumference. To obtain these, the following method will be found to be very satisfactory. With a ring or odontometer the root is measured as heretofore. The wire or ring is then pushed as far as possible over a tapered rod of wood or metal, and the place is marked where it exactly fits. At the tip this rod should be fifteen millimeters and at the base about forty millimeters in circumference. Thin copper bands, of which most everybody has a supply in his office for taking inlay impressions, are then tried upon the rod until one is found that exactly fits at the mark indicating the measurement of the root. This band is then trimmed and fitted to the root. The copper being thin and soft, this operation is easier and less painful than that of fitting a shell crown. When the fit is considered satisfactory, a stick of softened modeling compound, of about the diameter of the root, is forced into the band.

If, upon carefully removing the band with the compound, we examine the impression, we not infrequently meet with surprises. The band, which under other circumstances would have been the finished crown, proves to not have so good a fit as we had imagined. By carefully examining the impression we can determine whether our original measurement has been correct, too large, or too small, or whether the root has any peculiarity of outline. Should the margins of the root be clearly defined, we may consider the impression to be satisfactory. If, on the other hand, the impression be defective, another must be made either with a different sized

band or with more care in getting the band between the root and the gum at all points. The height of the finished crown should then be determined by laying a small lump of wax upon the root and requesting the patient to close the teeth. This also gives the distance between the adjacent teeth. If seamless crowns are used, it is best to pick out the model at this stage.—H. W. C. BÖDECKER, *Dental Review*.

Dental Erosion.—In the affection of the teeth known as erosion we find the results of a chemical action. This erosion generally appears in situations which do away entirely with any idea of fermentation from food lodgment; from the action on the enamel we come to the conclusion that the active agent must be an acid, and in the anterior teeth we may look for the production of this acid in the mucous glands of the lips. As erosion occurs mostly in persons of a gouty or rheumatic tendency, we conclude that instead of the secretion of the labial glands being alkaline, as it normally should be, it has, from the influence of the excess of uric acid in the system, become vitiated and distinctly acid in character; and being constantly washed in this acid medium, the enamel gives way under the influence, and little by little erosion occurs. The cause of the acidity of the secretion of the labial follicles is the improper oxidation in the cells, the result of either the presence of less oxygen in the body, owing to the paucity in the number of the red corpuscles in the blood of individuals showing a uric acid diathesis, or the use of more oxygen by the effort to oxidize all the material of which the body should rightly rid itself.—BESSIE BURNS BENNETT, *Dental Digest*.

Points in the Treatment of Abscessed Teeth.—The object desired in treating abscessed teeth is to allay inflammation. To do this the cause of it must be removed, and be kept removed.

Be thorough and exact.

Use tincture of iodine to reduce the inflammation.

Use hydrogen dioxide for cleansing the pulp-cavity and the canals. No other cleanser is necessary or so good.

Fill the tooth as soon as possible after the test filling has demonstrated that it will bear filling. Three days are a sufficient test.

Take the measurement of the root when the broach goes through the foramen easily.

Don't go beyond the end of the root in cleansing and treating.

Don't force medicine of any kind beyond the apical foramen.

Don't use irritating medicaments, such as creasote, carbolic acid, oil of cloves, trichresol, etc., in trying to reduce any inflammation. They increase it.

Don't neglect following up your treatment. If neglected the temporary filling becomes foul and a source of trouble.

Don't try to open canals with drills, unless in rare cases, and then use fine flexible drills.

Don't drill through the foramen.—J. R. OWENS, *Dental Summary*.

Copper Cement.—One of the most useful and least used or appreciated of filling materials is copper cement. Inquiries from users and non-users developed two reasons for its not more extensive use, namely, ignorance regarding its virtues and prejudice on account of its color and staining qualities. There are three operations where its frequent use is especially indicated:

Deciduous Molars. In deciduous molars its use is especially indicated. It is probably the only cement made with any antiseptic properties; this is due to the salts of copper, which are styptic and astringent, and experience has proved that these salts permeate the tooth-structure to a perceptible degree, carrying their germicidal, antiseptic and hardening properties into the dentin. It is the most tenacious cement made, consequently less attention need be paid to the retentive shape of the cavity. In cases of children, where through dread of supposed pain to be inflicted it is impossible to properly prepare a cavity, the fact that the cement is exceedingly tenacious, as well as being a germicide, indicates its use either alone or as a cavity lining beneath amalgams, and any small portion of soft tooth tissue necessarily left in the cavity is probably placed beyond possibility of creating further trouble.

Permanent Molars. For lining cavities in permanent molars which are to be filled with amalgam, where the tooth-structure is of such disintegrated character as to indicate a rapid recurrence of decay, the use of copper cement used either as a lining and allowed to harden, or used in a soft state in combination with amalgam, is a safe procedure for permanence. Buccal cavities well under the gum margin present another ideal location.

Shell Crowns. A condition is often found in molars, especially when an ill-fitting shell crown has been removed, where the remaining tooth-structure is simply a mass of soft, disintegrating tissue which it is seemingly impossible to place in position for re-crowning. A root of this character should be built up

with amalgam on top of soft copper cement, and at the next sitting prepared for crowning in the same way as an ordinary tooth, and the crown set with copper cement. If for any cause the crown has to be removed, you will find a hard, dense mass of tooth-structure, copper cement and amalgam, in good condition for future use, and not the soft, mushy, malodorous condition so often found, when ordinary procedures have been followed and you have "trusted in providence for preservation."—J. P. Root, *Western Dental Journal*.

Cleaning the Dental Engine.—No instrument is more abused than the dental engine. In a spare moment it will pay the dentist to take the engine apart and to thoroughly wash the individual parts with petroleum or alcohol and dry them. The small particles of steel that have come off owing to the continual friction unite with the oil to form a resinous black mass. After this mass is carefully removed, the parts are slightly oiled and put together again. The parts may also be boiled in a strong solution of soda or sodium hydrate. It is a pleasure to note the easy working of the engine after this operation.—E. SCHMID, *Deutsche Zahnärztliche Zeitung*.

Restoration of Fractured or Badly Decayed Roots, where the Tooth-Structure is Destroyed Under the Gum Margin.—

After removing all decay, take any ordinary porcelain crown, and grind it flat on the surface that forms the joint. Put the pin through a piece of inlay wax sufficiently large to fill the space between crown and root. Force the crown to the desired position. Cool the wax and remove, preparing the impression as for any cast inlay, leaving the wax in position on the pin. Cast the inlay to the pin, then, if you have used a removable pin crown, cement the crown to the pin and finish the gold inlay after the cement has set, as you can do no polishing after the crown is in position. When you have set your crown, there will be a restoration with perfect joints, without shoulders or rough margins. There will be no irritation of the soft tissues, and the gum will entirely cover the gold. This crown can always be easily repaired without the removing pin, should the porcelain ever break. Grind to fit the gold inlay and cement to place a crown of the same make as was first used, which can be done in a few minutes with little trouble. A Logan crown can be used, if preferred, by casting gold against the porcelain, but in case of a break it would be more difficult to repair.—H. G. Bow, *Dental Summary*.

A Case of Mandibular Resection.—Prof. W. Wayne Babcock of the Philadelphia Dental College, in illustrating an address on the subject of "Surgical Treatment of Malocclusion of the Jaw," presented a patient of eighteen years of age, who had been deformed by an aggravated and progressive protrusion of the mandible, and who had been under the treatment of several dentists for caries of the teeth, the prognathism evidently being regarded as incurable. In order to make sure that this case could not be cured by the orthodontist, Professor Babcock sent the young man for examination to the most eminent specialist upon that subject in Philadelphia, who pronounced it as incurable by means of the usual regulating methods for prognathism. After studying the case, Professor Babcock anesthetized the patient, made a perpendicular incision through the soft tissues in front of the ear, cut transversely across the rami of the mandible, dextrously evading the inferior dental nerve, and avoiding other undesirable anatomical complications. The operation was repeated on the other side and consumed altogether about half an hour. The mandible was moved back, so that normal articulation was secured with the teeth in the maxilla. The well-known headgear and chin cap were adjusted and the bone was given the opportunity of reuniting the resected rami by skillfully arranged flaps of periosteum, also the soft tissues were allowed ample time to heal. At first the patient could not breathe through the nostrils, but the nares gradually adjusted themselves to the changed conditions. The pharynx, which had been observed to be narrow before the operation, leaving some doubt about the final success of the operation, also adjusted itself admirably. The tongue at first appeared to be too large and filled up the mouth, owing to the diminished space, but this difficulty also vanished after some time.

The examination of Professor Babcock's patient showed that the lower jaw had ample lateral as well as perpendicular movement; the bite was restored, the speech was clear, and the general outward appearance of the face was symmetrical and comely.

A similar surgical operation, dividing the maxilla in appropriate directions, is feasible for correcting cases of acromegaly, or protrusion of the superior maxillary bone, alveolar process, and teeth.

Professor Babcock exhibited some ivory pegs, splints, and adjuncts which he used in surgical operations upon bones to secure them after a fracture or readjustment. The most interesting objects were screws, bolts, nuts, and splints constructed of manganese. With these accessories any bone could be securely

clamped into proper position and held firmly until reunited, the metal ultimately being absorbed. Ivory and manganese, in Professor Babcock's judgment, constitute two of the best materials for this purpose.—*Dental Scrap Book*.

Etching Liquid for Steel.—This liquid is made by mixing one ounce of sulfate of copper, $\frac{1}{4}$ of 1 ounce of alum, $\frac{1}{2}$ teaspoonful of salt reduced to powder, with 1 gill of vinegar and 20 drops of nitric acid. This liquid may be used for eating deeply into the metal or for imparting a beautiful frosted appearance to the surface, according to the time it is allowed to act.—*Western Dental Journal*.

Vaselin Flux.—Borax from which a part of its crystalline water has been removed by calcination is more practical for soldering than crystallized borax. Calcined borax no longer effervesces and does not displace the particles of solder from their original position. Since calcined borax, if brought into contact with water, will effervesce again, the following mixture is made: White vaselin 1 part, finely pulverized calcined borax (so-called borax glass) 1 part. The borax must be extremely finely pulverized and is added to the vaselin in a melted state. In soldering, the places to be soldered are painted with the mixture.—*Zeitschrift für Zahnärztliche Orthopädie*.

Cleaning Pyorrheal Pockets.—First of all the tartar is removed from the roots without injuring the sockets of the teeth. Perfect success depends not so much on the set of instruments used as on the operator's skill. The process is a lengthy and difficult one; the calcareous deposits at the necks of the teeth are removed with a very fine fissure bur, and the teeth polished afterward with a minute cone-shaped bur. Then perhydrol is forced into the pockets. The method of applying it consists in dressing the end of a small horse-hair pencil with soft sticky-wax, in order to keep the hair together and to render the brush stiff. The brush is dipped into the perhydrol, and by a rotary movement introduced into the pockets. It is washed and wiped every time before being dipped again into the perhydrol. After the first treatment the pockets will fill with white pus, which is removed by a water spray. The pus grows less after every application, and the gingivæ are given a strenuous massage with the finger-tips, starting from the apex of the root toward the crown of the tooth. This massage is repeated daily, and the patient supplied with a brush and diluted per-

hydrol in a well-corked bottle. Energetic use of a tooth-brush without powder is advised, or instead of the dentifrice table salt may be used on the gums and teeth. If applied at an early stage this treatment permits of a favorable prognosis, and a great many teeth can be saved.—JENS BOBERG, *Tandlægebladet*.

[Perhydrol is a highly concentrated hydrogen dioxide preparation (30% absolute H_2O_2) made by Merck.—ED. DENTAL COSMOS.]

An Expedient Accurate Method of Making a Bridge Bite.—If the first and second lower right molars have been extracted and we wish to make a bridge to replace them, make the crowns and place them in position on the teeth. Mix the plaster as for an impression, and with a spatula place a considerable quantity of the soft plaster over the crowns and teeth. Have the patient close the teeth and instruct him to press the plaster up against the lingual side of the teeth with the tongue. Mold the plaster about the buccal side by pressing on the outside of the cheek. Have the patient hold the jaws perfectly quiet until the plaster is thoroughly set. By examining the teeth on the opposite side of the mouth you can tell whether or not the patient has given you the correct bite. When the plaster is thoroughly set, have the patient open the mouth. Usually this will break the impression apart. You then remove the pieces, take the crowns off the teeth, and place them in position in the impression. Put your impression together, holding the pieces in place with some sticky-wax. Thoroughly shellac the impression. Pour the lower half; after this has set, pour the upper half.

When the plaster of the models has thoroughly set, break away the impression from the buccal side of the model. This may be broken away in pieces, as you no longer need this portion. After breaking away the impression from the buccal side, carefully remove the models from the lingual impression without destroying it, as we wish to use this for an articulator. Place your lower model in position on the lingual half of the impression. Then place your upper model in position. You will see that you have the exact relation of the two jaws with no possible chance of a mistake, as might be made in preparing two models and articulating them in a wax bite. There is always a possibility that the models may be tipped a little one way or the other, and that we may not obtain an absolutely correct articulation. With the method just described there is no chance of a mistake; only one impression needs to be taken and the models need not be mounted on

an articulator, since the lingual impression is used for an articulator.

On placing the models on the impression, you will see that the portion of the plaster between the teeth where the dummies are to go is in the way of putting in the dummies; consequently that portion of the impression is cut away, leaving an open space in which to place the dummies.—*Dental Digest*.

How to Force the Gums Away from Roots.—A small plate of Victoria metal with a suitable pivot is covered with soft gutta-percha and fitted under application of slight pressure into the root, after the latter has been cleaned and disinfected. Owing to the pressure and to the expansion of the gutta-percha the surface of the root is free in one to two days, and the band can be adapted without causing bleeding.—*Deutsche Zahn-ärztliche Zeitschrift*.

Restoring Broken and Short Pins in Crown Work.—It sometimes happens that the pin of a Richmond crown is broken off rather short within the coping. If an extension of the pin could be made the crown might be used again. A bit of thin platinum may be rolled up to make a tube that will fit over the broken stub of the pin. Into this fitted end push in a bit of moldine and fill the rest of the tube with solder. Then with the crown properly invested slip the open end of the platinum over the stub and gradually heat up until the solder flows and fuses the whole piece together. This new pin can then be shaped as desired and readjusted to the hole in the root. It sometimes happens that a pin has been filed down a little too short. Wrapping on a little of this same platinum and soldering as above will readily remedy the trouble. Fine platinum wire or even gold wire may be used for the same purpose.—R. B. TULLER, *Amer. Dental Journal*.

The Administration of Ethyl Chlorid and Nitrous Oxid Mixed.—Nitrous oxid and ethyl chlorid as a general anesthetic has its limitations. If it is desired to operate for more than 100 seconds, or at most 120 seconds, ether or preferably gas and ether should be used, while, of course, for operations requiring less than thirty seconds, nitrous oxid alone is sufficient. Patients are not so liable to dream under a mixture of ethyl chlorid and nitrous oxid as under nitrous oxid; if they have any dreams, these are much pleasanter, and on awakening, they are not so frightened. It is exceptional for a patient who has been suitably prepared, *i.e.* has had nothing more than a light meal of tea

and toast for some hours, to have any headache or sickness, while for the operator this form of anesthesia is much more convenient. There is no opisthotonos, jactitation, or cyanosis, nor any inconvenience caused by an increased flow of mucus or by a swelling of the tongue; while the longer time available allows the operator to extract in a more careful manner.

With an anesthesia of eighty to one hundred seconds, it is possible for an average extractor to clear a mouth with two administrations—not, of course, on the same day—while in one case recorded in the Edinburgh Dental Hospital thirty-one teeth were extracted with one administration.—H. ALVIN MAHONY, *British Dental Journal*.

Nitrate of Silver in Dentistry.—In the treatment of deciduous teeth with silver nitrate, the object is to inhibit further carious action. As this is done by the layer of coagula and new chemical compounds formed, it is not necessary to leave the salt very long in contact with the dentin. After the cavity has been freed as far as possible of carious dentin, and the soft tissues have been protected in some suitable manner, a moistened orange-wood stick is dipped in the powdered crystals and applied to the cavity, leaving it about one minute. All surplus should be wiped from the cavity. This use of the silver salt constitutes probably its most important function in dentistry.

Silver nitrate, generally in the solid form, has been used as a cauterant for the ulcers of aphthous stomatitis or indolent ulcers of the mucous tissues resulting from the irritation of ragged cavity margins, ill-fitting prosthetic appliances; or other sources of continued irritation. In the treatment of all forms of chronic ulceration it has come to be regarded as one of the most valuable agents available. There is one exception to this, however. In the treatment of pyorrhea nitrate of silver, though it has been tried like everything else, has not gained the reputation which its virtues would seem to warrant. It would seem that where a mild cauterant is desired for pyorrhea pockets, silver nitrate would be ideal, on account of its shallow penetration and mild yet efficient action. It cannot, of course, soften and loosen the deposits on roots, as is claimed for some of the caustic acids; nor will it, as is claimed for the opsonins of the blood, seize these deposits and bear them off in some mysterious way. But it will destroy bacteria, neutralize their acid products, and provoke a healthy growth of granulation tissue.—F. G. WORTHLEY, *Western Dental Journal*.

Automatic Chisel.—Screw a broad cone-socket chisel into an automatic gold plugger—one that you no longer use. This makes an excellent instrument for breaking down overhanging enamel walls. Use short, strong blows.—A. F. DONAHOWER, Philadelphia.

Antidote to Arsenic.—

Solution of ferric sulfate (35%),	80
Calcined magnesia,	15
Water,	405

The solution of ferric sulfate is mixed with 225 parts of water. A mixture of 15 parts of calcined magnesia and 180 parts of water is added in small portions, by stirring and avoiding heat. The antidote is to be prepared in case of need.—*L'Union Pharmaceutique per Revue Internationale de Prothèse Dentaire.*

Separating Media for Accurate Orthodontia Casts.—Two are required—shellac and sandarac, each dissolved in grain alcohol; strain through several thicknesses of cheesecloth.

Shellac solution. This should be just thick enough to act as a filler for dry plaster, and should give the merest suggestion of a gloss with one coat. A better color as a separating indication may be obtained by adding two drops of black rubber stamp ink to each two ounces of solution.

Sandarac solution. Apply to the cast when the shellac coat is dry. This solution should be thin enough to drop rapidly from the brush and thick enough to give a light gloss on one coat. A second coat to the tooth-surfaces gives a fine finish.

Clean each brush in grain alcohol after use, and keep the solutions in office preparation bottles (vaselined outside and ground stoppered).—V. E. BARNES, *Dentist's Magazine*.

The Danger in Large Metal Inlays.—That there is danger in the use of large metal inlays in vital teeth will be seen in the following case of a lady who—her family dentist being ill—consulted the writer with reference to two teeth, a first and second bicuspid respectively, which were loose and very tender to percussion. There was an extensive edema of the region directly below the eye and above the roots of the bicuspid teeth. After removing a beautiful disto-occlusal gold inlay from the first bicuspid tooth, an incision was made a trifle above the apex of the first bicuspid, through which pus and serum in large quantities was discharged. The patient was requested to take three doses of magnesium sulfate of 1 dram each that day, also an anti-

septic bichlorid wash was prescribed to be used four or five times daily.

The incision was packed loosely with a sterile cotton thread dipped in carbolic acid, to keep it open. The following day the swelling was almost eliminated, the cotton thread was removed, and the canal treatment was carried to completion in three visits.

The tooth had been vital prior to the setting of the inlay. The death of the pulp no doubt occurred from the constant irritation by thermal shocks transmitted by the highly conductive metal.

After treatment, the cavity in the crown was filled to about two-thirds of its depth with cement, and an inlay was cast for restoration of the contour.

In cases of large restorations in vital teeth, the writer frequently uses temporary stopping, filling about two-thirds of the cavity, and then takes an impression for the inlay. After the inlay is cast the temporary stopping is removed, the cavity partially filled with cement and the cavity surface of the inlay, covered with cement, is forced into position. This practically makes a hollow inlay, reducing the danger to vital pulps from thermal shock to a minimum.—A. M. HAAS, *Garretsonian*.

Translucent Cements.—In a report made before the general meeting of the Southern Counties Branch, Eng. Mr. Stanley Read offered the following observations: For adhesions the most suitable substance on which to test the adhesion of translucent cement was dentin. He ground the crowns of sound molar teeth so that they presented a smooth surface of one-quarter inch square; two of these were then joined together with cement, and the tension in pounds at which they broke was noted separately. In order to obtain the best adherence, it was necessary to have the teeth moist, for to dried-up specimens the cement would hardly adhere at all. The results, taken on averages, were: Schoenebeck broke at 31 lb. pressure; Astral broke at 40 lb. pressure, while Harvardid would not stick sufficiently to be tested.

For solubility, ten cubes of each kind, weighing in the aggregate 100 grains, were placed in 1 per cent. malic acid for fourteen days: Schoenebeck lost 20 grains, or 20 per cent.; Astral, 16 grains, or 16 per cent.; Harvardid, 19 grains, or 19 per cent.

The temperature at which these cements set is very high indeed, but varies with each mixing; the lowest temperature recorded in these tests was 84° and the highest 170°. In the essayist's opinion these cements are like the mortar which is used in house-building; the

building material has little strength in itself, but depends for its hardness on the quality and sharpness of the grit with which it is incorporated.—*British Dental Journal*.

Hardening Steel.—Mix two teaspoonfuls of water with half a teaspoonful of flour and one spoonful of salt. The steel to be hardened must be hot enough to be covered with a crust when it is thrown into this mixture. Then the steel is heated to red heat and suddenly plunged into soft water. If the operation has been successful, the steel will come out of the bath with a white surface.—*Zeitschrift für Zahnärztliche Orthopädie*.

Pain After Extraction.—Post-extraction pain results generally in cases of pericementitis, due to the pressure of the clot in the terminal nerve-filaments in the already congested tissue. It is therefore essential to thoroughly cleanse the socket with *hot* normal saline solution, then to wipe out the cavity with a pellet of cotton dipped in H_2O_2 , and to afterwards wash out the socket with warm water. We then dry the cavity as far as possible and pack in aristol with dry cotton; as a rule, the pain will be relieved.

Occasionally you will have post-extraction

pain due to the exposure of process fractured while extracting. In such cases all you can do is to stimulate granulation by the use of some astringent wash. A favored prescription of mine is:

R—Potassii chloratis,	5ij;
Tinct. krameriæ,	
Glycerinæ,	āā 3ss;
Aquæ rosæ,	3viiij.

Sig.—Use as a mouth-wash.

—J. M. SCHWARTZ, *Odontologist*.

To Remove Blood from Root-canals.—In extracting pulps and treating the root-canals, great care must be taken in order to preserve the color of the teeth. The dark discoloration is generally due to blood being left in the dentin of the crown. The usual method of wiping the bloody canal with hydrogen dioxid is contra-indicated because the iron of the hemoglobin oxidizes, and the pigments are forced into the tubules by the gases generated in the course of decomposition. In order to avoid a change in the color pigments of the dentin, the blood can be removed with alcohol or with sterilized water mixed with a little sodium chlorid.—J. BUCKLEY, *Deutsche Zahnärztliche Zeitung*.

OBITUARY.

DR. B. F. BARCLAY.

DIED, in his sixty-eighth year, at his home in New York city, December 7, 1908, B. FRANK BARCLAY, D.D.S.

Dr. Barclay was the youngest of the three sons of James Barclay and Ellen Porter of Darlington, Beaver co., Pa., all of whom attained high rank as skilful practitioners of dentistry. Born in Darlington on February 4, 1841, he received his early education in the schools of his native county. At an early age he began the study of dentistry with his elder brother, Dr. George J. Barclay of Dalton, Ohio, with whom he was thenceforward associated, except during his army service in the civil war, until the death of the elder. In 1873 the brothers removed to Pittsburg, where they quickly secured one of the largest and most lucrative practices in the city. Their work was confined entirely to pres-

ervation of the natural teeth by treatment and operation, in which branch both were marvelously skilful. In 1885 Dr. Barclay was graduated from the Maryland Dental College.

In 1878 the elder brother died, and eight years afterward Dr. Frank Barclay transferred the scene of his activities to Paris, where for eighteen years he was very successful as a dental practitioner. In 1904 failing health, due to the onerous demands of his professional work, led to his retirement from active practice. He then, after his health had been measurably restored, took up his residence in New York city, resuming practice, mostly at the instance of former patients who insisted on his services. Attacked by a stomach malady, he was operated upon, and died shortly after.

The funeral services were conducted at his late residence by Dr. Edward G. Thurber,

former pastor of the American Church in Paris. The impressive ritual of the Grand Army of the Republic was rendered by comrades of Lafayette Post, of which Dr. Barclay was a member. The remains were interred in Beaver Cemetery.

Of the Scotch-Irish blood which has done so much for the development of middle and western Pennsylvania, Dr. Barclay possessed the sturdy traits of his race. Starting out in the study of his profession with a determination to succeed, he attained the highest degree of excellence. Ever seeking to improve his art, he studied with the best practitioners. As an operator he ranked with the best, though he was never active in society work. He was a man of fine character, a genial companion, and a good friend. One brother, Dr. J. T. Barclay of Cleveland, and three sisters, survive.

DR. HENRY L. UPHAM.

DIED, February 26, 1909, at his home in Boston, Mass., HENRY LAURISTON UPHAM, D.M.D., at the age of sixty years.

The following sketch of Dr. Upham's career accompanied the resolutions adopted by the Harvard Odontological Society, as prepared by the committee appointed to draft a fitting expression of regret upon the loss of their esteemed fellow member:

Henry Lauriston Upham was born in Philipston, Mass., February 25, 1848, and died in Boston, Mass., February 26, 1909. He was the son of Joseph E. and Susan P. (Newton) Upham. His early education was obtained in his native town, he being graduated later from the Templeton (Mass.) High School, after which for a short period he attended the New Ipswich Academy, at Ipswich, Mass., and later the Woodstock Academy at Woodstock, Vt., in the vicinity of which place he afterward taught school; his intention was to have paid his way through college.

In early life he suffered from typhoid and rheumatic fevers, and he went for a time to Dr. Jackson's Sanatorium at Dansville, N. Y., where he improved in health; afterward he went to Hot Springs, Arkansas.

During a business career in Tiffin, Ohio, he was a member of the Tiffin water board. Later he decided to enter the Harvard Medi-

cal School, which he did in 1883—partially with a view of becoming a physician in order to study his own condition and benefit thereby. After passing all the examinations at the close of the first year, owing to financial reverses he concluded to change to the Dental School, where he was graduated in the class of 1886, of which he was secretary.

For eleven years (1891-1902) he was instructor in operative dentistry, Harvard University. He was an active member of the Harvard Odontological Society from 1887 to his death. He was its anniversary orator in 1891 and its editor from 1889 to 1899. He was also a member of the Harvard Dental Association from June 1886 until his death, being secretary for three years, 1892-1895. He was a member of the Massachusetts Dental Society from 1894 to 1901, was a councilor from 1895 to 1899, and its editor from 1898 to 1899.

Dr. Upham was an honored member of the profession, an able practitioner, writer, thinker and teacher, universally loved and respected by his *clientèle* and *confrères* for his high ethical standing and his scholarly attainments.

Few men in our profession are so greatly loved and respected as was he by those who were so fortunate as to intimately know him, and no one in the community in which he lived will be more greatly missed or more sincerely mourned. His was a great nature, and his sympathetic hand and heart were felt where sympathy was needed.

RESOLUTIONS.

RESOLVED, That in his decease we have suffered the loss of a member who took an active interest in this society and had the welfare of the profession at heart.

RESOLVED, That we, the members of the Harvard Odontological Society, express to the members of his bereaved family our sympathy and sorrow in their affliction, and assure them of our admiration for his high personal and professional qualities.

RESOLVED, That these resolutions be spread upon the records of this society, and a copy sent to the family of our departed member, and that copies be sent to the dental journals for publication.

WALDO E. BOARDMAN,
JULIUS G. W. WERNER,
LYMAN F. BIGELOW,

Committee.

Fifth International Dental Congress.

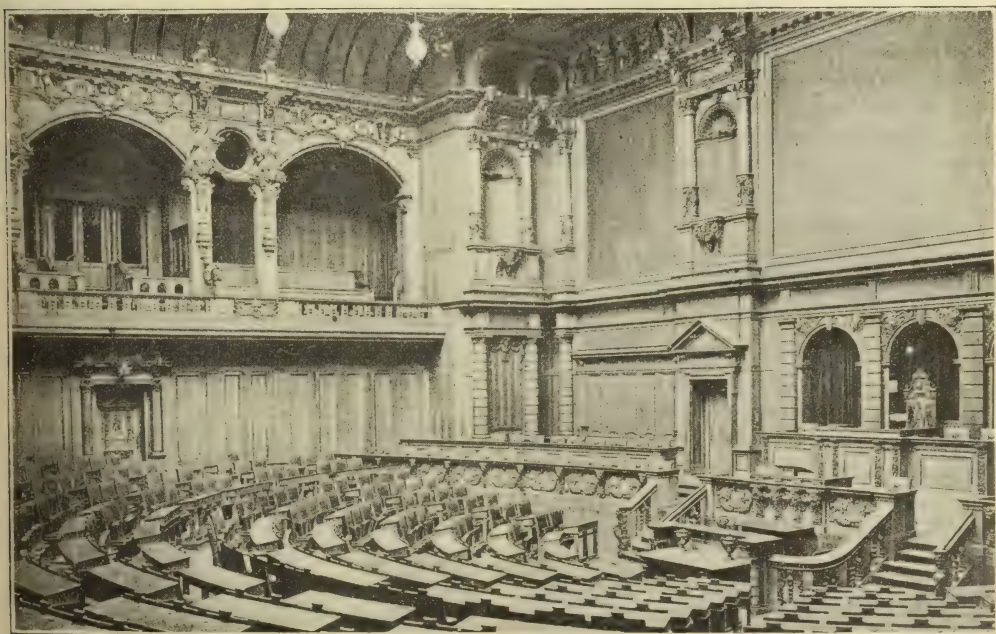
Berlin, Germany, August 23 to 28, 1909.

OFFICIAL COMMUNICATION FROM THE COMMITTEE OF ORGANIZATION.

Invitation.

TO our colleagues of all nationalities we hereby extend a hearty invitation to participate in the FIFTH INTERNATIONAL DENTAL CONGRESS, to be held

invited the congress to meet in Berlin in 1909, the German dentists were greatly pleased at the unanimous acceptance of their invitation.



GRAND ASSEMBLY-ROOM, REICHSTAG BUILDING WHERE THE GENERAL SESSION OF THE CONGRESS WILL BE HELD.

in Berlin, August 23 to 28, 1909, in the Reichstag building.

When at St. Louis in the year 1904 the highly appreciated and respected Professor W. D. Miller, as president of the Central-Verein Deutscher Zahnärzte,

The congress will be coincident with the fiftieth anniversary of the Central-Verein Deutscher Zahnärzte. The united German dental profession is therefore preparing to worthily celebrate this occasion, and to make the theoretical and

practical results of this congress stand out as a landmark in the development of dental science.

Colleagues of all nations will combine, and in friendly rivalry giving and taking, learning and teaching, demonstrate to the educated world what great progress the science of dentistry has made in recent years!

Through well-attended meetings at which representatives of all nations will discuss theoretical and practical problems, dentistry will prove itself an independent science, worthy of being regarded as one of the numerous intellectual achievements of mankind.

The German Organization Committee, selected by the F. D. I., the Central-Verein, and the Vereinsbund, have completed their preparations, and now appeal to all colleagues, both at home and abroad, for their esteemed support.

The Reichstag building offers ample space for the meetings of the congress, which is divided into twelve sections. The Berlin Local Committee will do everything possible to entertain the visitors in the German metropolis during the time not occupied by more serious pursuits.

An International Dental Exhibition, to which the members are earnestly invited to contribute, will in the widest sense demonstrate the progress of our profession.

Honorary Presidents of the Congress are: Geheimer Medizinalrat Prof. Dr. Waldeyer; Wirklicher Geh. Ober-Reg.-Rat, Ministerialdirektor Dr. Naumann; Geheimer Ober-Medizinalrat, Prof. Dr. Kirchner, and Geheimer Ober-Medicinalrat Dr. Dietrich of the Kultusministerium.

An Honorary Committee is also to be chosen.

The German Imperial Government has decided that the governments of the nations represented shall be officially informed of the meeting of the International Dental Congress in Berlin.

Besides the meetings of the individual sections, the congress will hold two general sessions. At these meetings time will be found not only for lectures and demonstrations, but also for the discussion of subjects of general interest proposed by the chairmen of the sections. All progress in scientific, technical, and operative dentistry, as well as the subject and development of dental hygiene, will be presented by the ablest authorities.

A meeting of the F. D. I. will take place at the beginning and at the end of the congress.

Colleagues,—With your united support, may the great work succeed! The invitation is most heartily given by your German colleagues. With our united strength, let us guide our profession to still greater success, for the honor of science, for the benefit of mankind.

WALKOFF, *President*,
SCHAEFFER-STUCKERT,
Secretary-general,

COMMITTEE OF ORGANIZATION OF THE FIFTH
INTERNATIONAL DENTAL CONGRESS.

To the President of the National Committee of the United States of America for the Fifth International Dental Congress, Berlin, Dr. EDWARD C. KIRK, Philadelphia.

Dear Doctor,—I herewith beg to transmit through you the hearty invitation and preliminary program of the German colleagues to our American *confrères*. The Committee of Organization has been very happy to be informed of the constitution of the National Committee of the U. S. A., containing so many valuable and prominent men, and we hope that you will succeed in bringing about a participation of American dentists in the Berlin Congress as extensive as possible. We can assure you that the German colleagues will be happy to welcome their American brethren to Berlin, and that international science and international

collegiality will succeed in creating by means of this congress a work of high and important value.

To prevent misunderstandings we must explain that the Central-Verein Deutscher Zahnärzte being the body inviting to the congress, it has been necessary that all organization work and all financial and local questions shall be in charge of German graduates, but that we also heartily welcome those graduates of foreign countries residing in Germany as associate members with the same rights and privileges. I myself shall personally present the invitation to the congress to the American Dental Society of Europe at the time of their meeting in Wiesbaden, and I am convinced that the work of the congress as assisted by colleagues of all nationalities will be a great success.

Trusting to hear soon from you and awaiting with pleasant anticipations the participation of our American colleagues, I am, dear sir,

Yours truly,

SCHAEFFER-STUCKERT,
Secretary-general.

Communication from the Berlin Local Committee.

General Chairman, PROFESSOR GUTTMANN,
24 Kurfürstendamm, Berlin.

The object of the Berlin Local Committee is to make the sojourn of those visiting the congress as agreeable as possible.

In order to fully meet all requirements, the committee has decided to send out a list of questions relating to hotel accommodations, seats at the banquets and entertainments, and excursions and tours to German cities and universities. By returning the questions fully answered, at an early date, the Berlin Local Committee will be able fairly accurately to judge of the number of those intending to be present at the different entertainments, etc. This will facilitate the work of the committee and also give an opportunity of considering individual wishes.

Anyone desiring special information regarding matters within the province of the Local Committee should communicate with the general chairman, Professor Guttmann, 24 Kurfürstendamm, Berlin, or with the chairman of one of the sub-committees. So far, the following of these have been formed:

(1) *Entertainment Committee*. Chairman, Professor Guttmann, 24 Kurfürstendamm, Berlin.

(2) *Business Committee*. Chairman, Dr. Robert Richter, 23 Victoriast., Berlin.

(3) *Committee on Inspection of the Scientific Institutions*. Chairman, Dr. Ritter, 94 Königgrätzerstr., Berlin.

(4) *Press Committee*. Chairman, Markuse, 12/13 Nettelbeckstr., Berlin.

(5) *Reception Committee*. Chairman, Willmer, Gr. Lichterfelde, Jungfernstieg 3.

(6) *Ladies' Committee*. Chairman, Guttmann, 71 Alexanderstr., Berlin.

(7) *Committee to procure the necessary apparatus for Lectures and Demonstrations*. Chairman, H. J. Mamlok, 143 Kurfürstenstr., Berlin.

(8) *Committee on Hotels and Accommodations*. Chairman, Pursche, 30 Rankestr., Berlin.

The Local Committee has made an arrangement with the Hamburg-American Packet Co., by which participants in the congress will receive, except during the height of the season, a considerable reduction of rates.

The Local Committee has been able to obtain the aid of a number of colleagues living in the larger cities of Germany, who are prepared to give advice and help to strangers visiting the congress. A list of these colleagues will be sent with the question blank.

Interpreters, distinguished by a special badge, who will be pleased to give their services, will be found in the office of the congress, at the meetings, entertainments, and on the excursions.

The official reception will be held in the Reichstag building. This magnificent and impressive structure is, above all others, a worthy meeting-place for serious scientific conventions. There is a sufficient number of rooms in this building for all sections to hold meetings simultaneously. The office will be established here several weeks before the beginning of the congress. A post-office

and telephone and telegraph stations in the building will be at the disposal of participants in the congress.

The Berlin Local Committee has undertaken to entertain the visitors during the congress. Arrangements have been made, giving visitors, during the time of the congress, free admission to the Zoological Garden and its concerts, as well as to the Landes-Ausstellungspark and the Annual Berlin Art Exhibition.

The City Council of Berlin has graciously promised a reception in the City-hall, on Monday evening, August 23d.

A banquet will be held on August 24th, in the hall of the Zoological Garden, to celebrate the fiftieth anniversary of the foundation of the Central-Verein Deutscher Zahnärzte.

For Wednesday, August 25th, no special entertainment has been provided, in order to allow each visitor to spend an evening as he prefers; nevertheless, a part of the Landes-Ausstellungspark (concert garden) will be specially reserved as a meeting-place for the participants in the congress.

Thursday evening, August 26th, the official banquet of the congress, followed by a ball, will be held in the Landes-Ausstellungspark.

For Friday, August 27th, afternoon and evening, the colleagues of Berlin and the Province of Brandenburg invite the participants in the congress to be their guests. In the afternoon a fleet of steamers, specially chartered, will make a trip through the scenically beautiful Havel Lakes. In the evening a banquet will be held at the Schwedischen Pavillon in Wannsee.

On Saturday, August 28th, an Abschiedstrunk (parting cup) takes place on the Terrassen am Halensee.

Excursions will be arranged to the environs of Berlin, as well as to various German cities and universities.*

The Local Committee will arrange that places and buildings of interest, as well as scientific institutions, can be visited and inspected with competent guides.

During the meetings the committee will arrange for the entertainment of the ladies accompanying the members of the congress.

All communications and items of interest will appear in the Daily Journal of the con-

gress, edited by Dr. Konrad Cohn. The perusal of this journal is therefore strongly recommended.

To the social functions, only those having tickets will be admitted. The price of these is 12 marks.

We hereby beg all colleagues to acquaint us *as early as possible* with their intention to visit the congress, and to send us a notification.

It is especially wished to obtain a list of lectures and demonstrations, also the number of visitors, at an early date; we beg that all notifications be sent at your very earliest convenience.

All questions regarding the journey and accommodations should be sent to the president of the Berlin Local Committee, Professor Guttman, Berlin, Kurfürstendamm 24.

All applications for membership should be forwarded to the National Committee in your own country, or direct to the secretary-general, Schaeffer-Stuckert, D.D.S., Kettenhofweg 29, Frankfurt a. M.

All inquiries regarding the exhibition should be sent to Prof. Dr. Dieck, Potsdamerstr. 113, Villa 3, Berlin.

Further information will be gladly given by the president, the secretary-general, or the secretary, Dr. Konrad Cohn, Potsdamerstr. 46, Berlin.

SCHAEFFER-STUCKERT, *Secretary-general*,

COMMITTEE OF ORGANIZATION OF THE FIFTH
INTERNATIONAL DENTAL CONGRESS.

Regulations of the Fifth International Dental Congress.

(1) The Fifth International Dental Congress will be held in Berlin, from August 23 to 28, 1909.

(2) The congress will be devoted to the scientific and technical progress of dentistry, and to the general interests of the dental profession.

The congress is composed of the following sections:

SECTION I: Anatomy, Physiology, and Histology. *Chairman*, Dr. Adloff, Königsberg i. Pr., Weissgerberstr. 6-7.

SECTION II: Pathology and Bacteriology. *Chairman*, Prof. Dr. Römer, Strassburg i. E., Universitätsplatz 1.

* We have received an official invitation from the city council of Darmstadt, and expect similar invitations from Cologne and Frankfurt a. M.

SECTION III: Chemistry, Physics, and Metallurgy. *Chairman*, C. Birgfeld, Hamburg, Alsterdamm 1.

SECTION IV: Diagnosis and Special Therapeutics; Materia Medica. *Chairman*, Prof. Dr. Michel, Würzburg, Wilhelmstr. 3.

SECTION V: Oral Surgery and Surgical Prosthesis. *Chairman*, Geheimrat Prof. Dr. Partsch, Breslau, Kaiser-Wilhelmstr. 3; Prof. Dr. Schröder, Berlin, Rankestr. 27.

SECTION VI: General and Local Anesthesia. *Chairman*, University Lecturer Dr. Fischer, Greifswald.

SECTION VII: Operative Dentistry. *Chairman*, Prof. Dr. Sachs, Berlin, Kurfürstendamm 247.

SECTION VIII: Prosthetic Dentistry, including Crown and Bridge Work; Ceramics. *Chairman*, Prof. Dr. Riegner, Breslau, Museumstr. 11.

SECTION IX: Orthodontia. *Chairman*, Hofzahnarzt Heydenhauss, M.D., Berlin, Potsdamerstr. 121A.

SECTION X: Hygiene of the Mouth and Teeth. *Chairman*, Hofrat Dr. C. Röse, Dresden, Daheimstr. 12.

SECTION XI: Education and Legislation. *Chairman*, Dr. Ritter, Berlin, Königgrätzerstr. 94.

SECTION XII: History and Literature. *Chairman*, University Lecturer Dr. Hoffendahl, Berlin, Schöneberger Ufer 20.

(3) "Ordinary members" of the congress are: Graduated dentists, who possess the diploma of the country in which they practice, and instructors of dentistry in universities. "Associate members" of the congress are: (a) Physicians; (b) foreigners, who do not possess the diploma of the country in which they reside. (The eligibility of persons not here provided for will be decided by the national committees; for Germany, by the Committee of Organization.) "Participants" are relatives of the members of the congress, and students of dentistry. Ordinary and associate members have equal rights.

(4) Applications for membership are to be sent to the national committees (in Germany, to the Organization Committee), together with name and address, and the fee of 25 marks. For relatives of the members of the congress, as well as for students, the charge for admission cards will be 10 marks.

(5) For admittance to the congress, a card bearing the name of the member, as well as a receipt for the dues paid, is necessary.

Visitors at the congress will receive the daily Journal of the Congress and the catalogue of the exhibition. Ordinary and associate members receive the Transactions of the Congress, gratis.

Lectures and demonstrations can be given by members only.

(6) The congress will convene in the Reichstag building.

(7) German, English, and French are the official languages of the congress; other languages may be used with the consent of the chairman of the section.

(8) The congress will hold a general opening session (Monday, August 23, 1909), a general session (Thursday, August 26th), and a closing session (Saturday, August 28th). There will be sessions of individual sections, as well as meetings of several sections together. Discussions will not take place at the opening session.

(9) Those wishing to give lectures, demonstrations, etc., should notify the chairman of the section, before May 15, 1909. Notices sent in after that date can be considered only after the program has been arranged. Should circumstances permit of more papers being read, the chairman has a right to select from those sent in after May 15th. It is advisable to let the national committees send in all contributions, etc., to the chairmen of the different sections.

(10) All lectures, etc., are to be delivered ready for printing in the language in which they are to be given, with a summary of the most important points, to the chairman of the section not later than June 15, 1909. This summary will be translated by the management and placed before the members of the section.

(11) Notice of practical demonstrations should be given to the chairman of the section before May 15, 1909, together with a list of accessories necessary for the demonstration. A short account of the purpose of the demonstration should be sent to the chairman before June 15, 1909. This account will be translated, and communicated to the members of the congress.

(12) The time at the disposal of a lecturer is fixed at twenty minutes; five minutes will

be allowed for speeches in the discussion. Extension of the time is left to the judgment of the chairman.

(13) Those taking part in the discussions should immediately note their remarks on a printed form, and give it to the secretary, if they wish their views to be published in the Transactions of the Congress.

(14) A pass for the various social functions will be issued at the price of 12 marks.

(15) There will be an International Dental Exhibition connected with the congress.

PROVISIONAL PROGRAM.

The following provisional program has been arranged:

SUNDAY, August 22d.

Meeting of the Fédération Dentaire Internationale. Evening: Reception of the guests at the Reichstagsgebäude.

MONDAY, August 23d.

Morning: Opening session. After the official address of welcome, four orators (German, English, French, and American) will speak on subjects chosen by themselves and important for the entire profession. The National Committees of the respective countries have each been requested to nominate their orator.

Evening: Reception given by the City of Berlin at City Hall.

TUESDAY, August 24th.

9 A.M.—2 P.M.: Sessions of the Sections.

Evening: Banquet in the halls of the Zoölogical Gardens.

WEDNESDAY, August 25th.

9 A.M.—2 P.M.: Sessions of the Sections.

Evening: Fiftieth anniversary of the Central Verein Deutscher Zahnärzte (Central Association of German Dentists) in the halls of the Rheingold.

THURSDAY, August 26th.

Second general session in the great hall of the Reichstagsgebäude. Subjects and questions will be discussed by speakers appointed by the different countries.

Evening—at the disposal of the congressists.

FRIDAY, August 27th.

9 A.M.—2 P.M.: Sessions of the Sections.

Evening: Reception in honor of the congressists given by the *confrères* of Berlin and of the province of Brandenburg.

Special train to Wannsee.

SATURDAY, August 28th.

9 A.M.—12M.: Sessions of the Sections (passing of resolutions) and meeting of the Fédération Dentaire Internationale.

3 P.M.: Closing session. Adoption of the resolutions of the Congress.

Evening: Farewell banquet at the Halensee Terraces.

On Sunday and after, groups of the congressists will visit German cities and universities.

INTERNATIONAL EXHIBITION OF DENTAL SCIENCE.

IN connection with the Fifth International Dental Congress in Berlin, August 23–28, 1909, an International Exhibition of Dental Science will be arranged, on a large scale, in the Reichstag building.

The progress of dentistry in all civilized countries cannot be better illustrated than by means of a systematically arranged, scientific exhibition.

The nature and extent of the proposed exhibition is evident from the following grouping:

GROUPS OF EXHIBITS.

1. Anatomy and physiology.

1. Comparative anatomy. (a) Anthropology and ethnology. (b) Comparative odontology including paleontology. (c) Anomalies of the teeth of animals.

2. Normal macroscopical anatomy of man (anatomy and development of the head, jaws, and teeth, including specimens of the jaws and teeth).

3. Normal microscopical anatomy.

4. Anomalies of anatomical development (anomalies of the development of the head, jaws, and teeth).

5. Physiology.

II. Pathology and bacteriology.

1. General pathology.
2. Special macroscopical pathology, including comparative pathology.
3. Special microscopical pathology.
4. Bacteriology of the mouth.

III. Surgery of the mouth and the jaws.

1. Surgical therapeutics, including narcosis and local anesthesia.
2. Surgical prosthesis, including obturators.

*IV. Orthodontia.**V. Preservative treatment of the teeth.*

1. Fillings. 2. Root-treatment.

VI. Prosthetic dentistry.

1. Plate work. 2. Crown and bridge work, including ceramics.

VII. Photography in dental surgery as a means of investigation and instruction.

1. Macroscopic photography. 2. Microscopic photography. 3. Stereoscopy. 4. X-ray photography. 5. Photography in colors.

*VIII. General dental education, post-graduate instruction, educational appliances.**IX. Hygiene of the mouth and the teeth.*

- (a) From the scientific, and (b) from the sociological point of view.

X. History of dentistry.

Instruments, pictures, and in short, everything of historical interest for dentistry.

*XI. Dental jurisprudence.**XII. Literature.*

- (a) Original works. (b) Periodicals.

The committee desires to be informed of the names of all public or private collections containing specimens of general or special interest for dentistry.

The committee of the exhibition urgently requests each to use his personal influence to arouse interest in behalf of the International Dental Exhibition.

The committee will take every possible precaution to insure the safety of any specimens loaned.

Prof. Dr. DIECK,

Chairman Committee on Exhibits,
Berlin, Potsdamerstr. 113, Villa 3.

**AMERICAN NATIONAL COMMITTEE FOR
THE FIFTH INTERNATIONAL DENTAL
CONGRESS.**

At a meeting of the Executive Council of the National Dental Association held at Pittsburg, Pa., Saturday, October 10, 1908, the following were appointed as the American National Committee, to forward the work of the Fifth International Congress and provide for the representation of American dentistry at that congress—to be held in Berlin, Ger., August 23 to 28, 1909:

American National Committee.

Edward C. Kirk, Philadelphia, Pa., *Ch'man.*
Burton Lee Thorpe, St. Louis, Mo., *Sec'y.*
Truman W. Brophy, Chicago, Ill.

*A. W. Harlan, New York, N. Y.
B. Holly Smith, Baltimore, Md.
G. E. Savage, Worcester, Mass.
Wm. Carr, New York, N. Y.
W. W. Walker, New York, N. Y.
J. D. Patterson, Kansas City, Mo.
Gordon White, Nashville, Tenn.
Chas. R. Turner, Philadelphia, Pa.
Chas. McManus, Hartford, Conn.
G. V. I. Brown, Milwaukee, Wis.
N. S. Hoff, Ann Arbor, Mich.
F. E. Ball, Fargo, N. Dak.
L. P. Dotterer, Charleston, S. C.
Eugene H. Smith, Boston, Mass.
Chas. L. Alexander, Charlotte, N. C.

COMMITTEE ON ESSAYS.

Edward C. Kirk, *Chairman.*
Burton Lee Thorpe, *Secretary.*
L. P. Dotterer.

COMMITTEE ON CLINICS.

Wm. Carr, *Chairman.*
J. D. Patterson, *Secretary.*
Chas. L. Alexander.

All Americans who expect to attend the congress are requested to send their names, with the title of their essay or clinic, to the secretary of the American National Committee at once.

BURTON LEE THORPE, *Sec'y,*
3605 Lindell Blvd., St. Louis, Mo.

* Deceased.

SOCIETY NOTES AND ANNOUNCEMENTS.

DENTAL SOCIETY MEETINGS:

May, June, and July.

MAY.

ALABAMA DENTAL ASSOCIATION. Anniston. Three days: May 11th to 13th.

ARKANSAS DENTAL ASSOCIATION. Hot Springs. Three days: May 26th to 28th.

EASTERN INDIANA DENTAL ASSOCIATION. Marion. Two days: May 5th and 6th.

ILLINOIS STATE DENTAL SOCIETY. Danville. Four days: May 11th to 14th.

IOWA STATE DENTAL SOCIETY. Des Moines. Three days: May 4th to 6th.

KENTUCKY STATE DENTAL ASSOCIATION. Crab Orchard Springs. Three days: May 17th to 19th.

LAKE ERIE (Pa.) DENTAL ASSOCIATION. Cambridge Springs. Three days: May 18th to 20th.

LEBANON VALLEY (Pa.) DENTAL ASSOCIATION. Reading. May 11th and 12th.

MISSISSIPPI DENTAL ASSOCIATION. Natchez. Three days: May 11th to 13th.

MISSOURI STATE DENTAL ASSOCIATION. Kansas City. Three days: May 26th to 28th.

NEBRASKA STATE DENTAL SOCIETY. Lincoln. Three days: May 18th to 20th.

NEW HAMPSHIRE AND VERMONT STATE DENTAL SOCIETIES. Weirs, N. H. Four days: May 18th to 21st.

NEW YORK STATE DENTAL SOCIETY. Albany. Three days: May 6th to 8th.

PENNSYLVANIA STATE DENTAL SOCIETY. Pittsburg. Three days: June 29th to July 1st.

SUSQUEHANNA (Pa.) DENTAL ASSOCIATION. Harvey's Lake. May 18th to 20th.

TENNESSEE STATE DENTAL ASSOCIATION. Memphis. Three days: May 25th to 27th.

VERMONT STATE DENTAL SOCIETY. [See NEW HAMPSHIRE.]

JUNE.

AMERICAN MEDICAL ASSOCIATION, SECTION ON STOMATOLOGY. Atlantic City, N. J. Four days: June 8th to 11th.

COLORADO STATE DENTAL ASSOCIATION. Colorado Springs. June 17th.

FLORIDA STATE DENTAL SOCIETY. Ocala. Three days: June 17th to 19th.

GEORGIA STATE DENTAL SOCIETY. Cumberland Island. June 1st to 3d.

INDIANA STATE DENTAL ASSOCIATION. Indianapolis. June 29th to July 1st.

MAINE DENTAL SOCIETY. Portland. Three days: June 24th to 26th.

MASSACHUSETTS DENTAL SOCIETY. Boston. Three days: June 9th to 11th.

MICHIGAN STATE DENTAL SOCIETY. Kalamazoo. Three days: June 29th to July 1st.

MINNESOTA STATE DENTAL ASSOCIATION. Minneapolis. Three days: June 22d to 24th.

NEW MEXICO DENTAL SOCIETY. Albuquerque. Two days: June 17th and 18th.

NORTH CAROLINA DENTAL SOCIETY. Asheville. Four days: June 23d to 26th.

OKLAHOMA STATE DENTAL SOCIETY. Oklahoma City. Three days: June 3d to 5th.

SIXTH DISTRICT (N. Y.) DENTAL SOCIETY. Binghamton. April 30th and May 1st.

SOUTH CAROLINA STATE DENTAL ASSOCIATION. Glenn Springs. Five days: June 28th to July 2d.

SOUTH DAKOTA STATE DENTAL SOCIETY. Huron. Three days: June 29th to July 1st.

SOUTHERN CALIFORNIA DENTAL ASSOCIATION. Los Angeles. June 28th to 30th.

SOUTHERN WISCONSIN DENTAL ASSOCIATION. Beloit. Two days: June 3d and 4th.

TEXAS STATE DENTAL ASSOCIATION. Waco. Three days: June 10th to 12th.

JULY.

CALIFORNIA STATE DENTAL ASSOCIATION. San Francisco. Three days: July 6th to 8th.

DELTA SIGMA DELTA FRATERNITY. Seattle. Three days: July 21st to 23d.

NEW JERSEY STATE DENTAL SOCIETY. Asbury Park. Three days: July 22d to 24th.

OREGON STATE DENTAL ASSOCIATION. Portland. Three days: July 12th to 14th.

VIRGINIA STATE DENTAL ASSOCIATION. Fortress Monroe. Three days: July 21st to 23d.

WASHINGTON STATE DENTAL SOCIETY. Seattle. Three days: July 15th to 17th.

WISCONSIN STATE DENTAL SOCIETY. Milwaukee. Three days: July 13th to 15th.

Examiners' Meetings.

ALABAMA BOARD OF EXAMINERS. Anniston. May 10th.

ARKANSAS BOARD OF EXAMINERS. Hot Springs. May 24th and 25th.

CALIFORNIA BOARD OF EXAMINERS. Los Angeles, June 3d; San Francisco, June 15th.

CONNECTICUT BOARD OF COMMISSIONERS. Hartford. June 24th to 26th.

FLORIDA BOARD OF EXAMINERS. Ocala. June 14th.

ILLINOIS BOARD OF EXAMINERS. Chicago. June 10th.

ILLINOIS CIVIL SERVICE COMMISSION. Chicago, Springfield, and Belleville. May 1st.

INDIANA BOARD OF EXAMINERS. Indianapolis. June 7th to 10th.

IOWA BOARD OF EXAMINERS. Iowa City. June 7th.

KENTUCKY BOARD OF EXAMINERS. Louisville. June 1st.

MAINE BOARD OF EXAMINERS. Portland. June 21st.

MARYLAND BOARD OF EXAMINERS. Baltimore. May 27th and 28th.

MICHIGAN BOARD OF EXAMINERS. Ann Arbor. June 14th.

MINNESOTA BOARD OF EXAMINERS. Minneapolis. June 7th.

NEBRASKA BOARD OF EXAMINERS. Lincoln. June 21st to 23d.

NEW HAMPSHIRE BOARD OF REGISTRATION. Manchester. June 1st to 3d.

NEW JERSEY BOARD OF REGISTRATION. Trenton. July 6th to 8th.

NORTH CAROLINA BOARD OF EXAMINERS. Asheville. June 18th.

OHIO BOARD OF EXAMINERS. Columbus. June 15th to 18th.

PENNSYLVANIA BOARD OF EXAMINERS. Philadelphia and Pittsburg. June 9th to 12th.

RHODE ISLAND BOARD OF REGISTRATION. Providence. June 22d to 24th.

SOUTH CAROLINA BOARD OF EXAMINERS. Glenn Springs. June 25th.

SOUTH DAKOTA BOARD OF EXAMINERS. Sioux Falls. July 13th to 15th.

TENNESSEE BOARD OF EXAMINERS. Nashville. May 18th to 21st.

TEXAS BOARD OF EXAMINERS. Waco. June 14th.

VERMONT BOARD OF EXAMINERS. Montpelier. July 13th to 15th.

WISCONSIN BOARD OF EXAMINERS. Milwaukee. June 21st.

AMERICAN MEDICAL ASSOCIATION.**Section on Stomatology.**

FOLLOWING is the program of the American Medical Association, Section on Stomatology, for its annual meeting at Atlantic City, June 8 to 11, 1909:

1. Chairman's Address. Edward C. Briggs, Boston, Mass.

2. "Enamel and Its Vitality." R. R. Andrews, Cambridge, Mass.

3. "A Study of Malnutrition in the School Child." E. Mather Sill, New York city.

4. "Suppression of the People's Disease." S. B. Luckie, Chester, Pa.

5. "The Role of the Teeth in Respiration." F. L. Stanton, New York city.

6. "Oral Prophylaxis." Alphonse Irwin, Camden, N. J.

7. "The Tonsils and the Teeth." G. Hudson-Makuen, Philadelphia, Pa.

8. "Mouth-Conditions in their Relation to Systemic Infection." Frederick K. Moorehead, Chicago.

9. "The Surgery of Cleft Plate." Geo. V. I. Brown, Milwaukee, Wis.

10. "General Therapeutics and Surgery in Dentistry." Arthur R. Dray, Philadelphia, Pa.

11. "Conservative Surgery for Treatment of Tumors of the Mandible." Thomas L. Gilmer, Chicago.

12. "A Method of Treating Mandibular Fractures." Robert T. Oliver, West Point, N. Y.

13. "The Treatment of Extreme Degrees of Malocclusion of the Teeth by Operations upon the Ramus of the Inferior Maxillary Bone." Wayne B. Babcock, Philadelphia, Pa.

14. "Osteomyelitis of the Jaw." H. H. Germain, Boston, Mass.

15. "Report of Two Record Tertiary Cases." G. Lenox Curtis, New York city.

16. "Trifacial Neuralgia." Fred Hussey, Providence, R. I.

17. "Anesthesia." L. G. Noel, Nashville, Tenn.

18. "A Summary of Thirteen Thousand Nitrous Oxid and Oxygen Anesthesias." Charles K. Teter, Cleveland, Ohio.

19. "Pseudo-pulpitis and Periostitis due to Rheumatoid Arthritis." William Mills, Baltimore, Md.

20. "Dental Roentgenology." G. E. Pfahler, Philadelphia, Pa.

21. "A Number of Cases in which the Nasal Sinuses have been Enlarged by Orthodontia." E. A. Bogue, New York city.

22. "Report of the Committee of Revision of Pharmacopeia." Hermann Prinz, Chairman, St. Louis, Mo., and G. B. Squires, Somerville, Mass.

23. "Report of the Committee on Vital Statistics." Geo. V. I. Brown, Chairman, Milwaukee, Wis.; Vida A. Latham, Chicago, Ill.; Frederick K. Moorehead, Chicago, Ill.

EDWARD C. BRIGGS, *Chairman*,
EUGENE S. TALBOT, *Sec'y*.

N. D. A. COMMITTEE ON HISTORY.

GUERINI'S HISTORY OF DENTISTRY.

We are pleased to announce that the publishers of this work expect to have the volume ready for delivery early in May.

THE COMMITTEE.

NATIONAL ASSOCIATION OF DENTAL FACULTIES.

THE National Association of Dental Faculties will hold their annual meeting in connection with the National Association of Dental Examiners in the Hotel Chamberlain, Old Point Comfort, Va., August 2, 3, and 4, 1909, commencing at 10 A.M.

Rates will be the same as the National Association of Dental Examiners. Railroad and steamship rates will be given at a later date.

B. HOLLY SMITH, *Chairman Ex. Com.*

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

THE twenty-seventh annual meeting of the National Association of Dental Examiners will be held at the Hotel Chamberlain, Old Point Comfort, Va., the first session opening at 10 o'clock A.M., Monday, August 2, 1909, and continuing during the 3d and 4th.

The result of the mail vote by the committee to ascertain the consensus of opinion as to place and date, from October 19th to the present date was ninety-one votes for Old Point Comfort the first three days of August, thirteen for Birmingham in March, seven for Birmingham in July; the president has therefore selected Old Point Comfort.

The rates will be: American plan \$3.00

per day without bath and \$4.00 per day with bath. Large and commodious meeting-rooms will be furnished free. Railroad and steamship rates will be furnished at a later date.

CHAS. A. MEEKER, *Sec'y*.

ILLINOIS STATE DENTAL SOCIETY.

THE forty-fifth annual meeting of the Illinois State Dental Society will be held at Danville, May 11, 12, 13, and 14, 1909.

R. J. HOOD, *Sec'y*,
Sparta, Illinois.

LEBANON VALLEY (PA.) DENTAL ASSOCIATION.

THE annual meeting of the Lebanon Valley (Pa.) Dental Association will be held in Reading, Tuesday and Wednesday, May 11 and 12, 1909.

JOHN T. BAIR, *Corresponding Sec'y*.

IOWA STATE DENTAL SOCIETY.

THE forty-seventh annual meeting of the Iowa State Dental Society will be held in Des Moines, Iowa, May 4, 5, and 6, 1909. All ethical dentists in the state are urged to be present and help make it the best in the history of the society.

T. F. COOKE, *Sec'y*,
Burlington, Ia.

MISSISSIPPI DENTAL ASSOCIATION.

THE sixteenth annual meeting of the Mississippi Dental Association will be held in Natchez, May 11, 12, and 13, 1909.

L. B. PRICE, *Sec'y*,
Corinth, Miss.

EASTERN INDIANA DENTAL ASSOCIATION.

THE 1909 meeting of the Eastern Indiana Dental Association will be held at Marion, Ind., May 5 and 6, 1909.

The 1908 meeting was postponed that the members might join in the big jubilee meeting of the state society, and the meeting this year is expected to be a record-breaker. Clinics are to be the main feature.

LEONARD STRANGE, *President*.

NEW YORK STATE DENTAL SOCIETY.

THE forty-first annual meeting of the New York State Dental Society will be held in Odd Fellows' Hall, Albany, N. Y., May 6, 7, and 8, 1909. [The date given in March journals was erroneous.] Note that the first session will convene promptly at 7.30 P.M. on the evening of Thursday, the 6th.

All day Saturday will be devoted to clinics, when all that is latest and best will be shown. A large exhibit also is assured.

Special railroad rate of one and three-fifths fare has been arranged with the Trunk-line Association. Ask for a certificate, not a receipt, when you purchase your ticket, in order to have the benefit of the reduced rate on the return trip.

PROGRAM.

President's Address. Dr. L. Meisburger.

Correspondent's Address. Dr. H. C. Ferris.

Report of Executive Council. Dr. G. B. Beach.

Report of Committee on Practice. Dr. W. B. Dunning.

Report of Committee on Scientific Research. Dr. L. M. Waugh.

Essays.

"Hard Teeth and Soft Teeth." Dr. Eugene S. Talbot, Chicago, Ill.

"Pyorrhea from a Bacterial Standpoint." Dr. Timothy Leary, Boston, Mass.

"The Relation of the Chemical and Physical Characteristics of Porcelain to Its Manipulation." Dr. W. L. Fickes, Pittsburg, Pa.

"Practical Cavity Preparation." Dr. H. E. Friesell, Pittsburg, Pa.

"The Relative Merits of the Cast and the Malleted Gold Fillings." Dr. D. N. Squires, Buffalo, N. Y.

ELLISON HILLYER, *Sec'y*, Brooklyn.

TENNESSEE STATE DENTAL ASSOCIATION.

THE forty-fourth annual meeting of the Tennessee State Dental Association will be held in Memphis, Tenn., May 25, 26, and 27, 1909. This meeting promises to be one of the most interesting gatherings of any within

the history of the association. Ample space will be provided for exhibitors and clinicians. A cordial invitation is extended to all reputable members of the profession to attend and take part in the proceedings.

DELAN KINNEY, *Cor. Sec'y*,
Nashville, Tenn.

SIXTH DISTRICT (N. Y.) DENTAL SOCIETY.

THE forty-first annual meeting of the Sixth District Dental Society will be held at the Hotel Arlington, Binghamton, N. Y., Friday and Saturday, April 30 and May 1, 1909. Mark off these dates on your appointment book now and arrange to be present.

F. W. MCCALL, *President*,
Binghamton, N. Y.
L. S. INGALLS, *Sec'y*,
Cortland, N. Y.

NEW HAMPSHIRE AND VERMONT DENTAL SOCIETIES.

A JOINT meeting of the New Hampshire and Vermont Dental Societies will be held at Hotel Weirs, Weirs, N. H., May 18, 19, 20, and 21, 1909, beginning the evening of the 18th.

FRED F. FISHER, *Sec'y*,
Manchester, N. H.

ALABAMA DENTAL ASSOCIATION.

THE fortieth annual meeting of the Alabama Dental Association will be held in Anniston, Ala., May 11-13, 1909.

The program will be an exposition of present-day methods of practice. Make your arrangements, now, to attend.

E. W. PATTON, *Sec'y*.
1010½ Broad st., Selma, Ala.

LAKE ERIE (PA.) DENTAL ASSOCIATION.

THE forty-sixth annual meeting of the Lake Erie Dental Association will be held at Hotel Rider, Cambridge Springs, Pa., on May 18, 19, and 20, 1909. All reputable dentists are cordially invited to share in this meeting.

V. H. MCALPIN, *Sec'y*.

KENTUCKY STATE DENTAL ASSOCIATION.

THE thirty-ninth annual convention of the Kentucky State Dental Association will convene at Crab Orchard Springs, Ky., May 17, 18, and 19, 1909. We anticipate a most interesting and profitable meeting at this most popular central Kentucky resort. A cordial invitation is extended to all ethical members of the profession.

W. M. RANDALL, *Sec'y.*

ST. LOUIS DENTAL COLLEGE ALUMNI ASSOCIATION.

THE Alumni Association of the St. Louis Dental College (formerly Marion-Sims) will hold their annual clinic at the college building, Grand ave. and Caroline st., on May 20 and 21, 1909.

An excellent program is being prepared. Special attention is being given to the clinical program. The annual banquet will be on Thursday night, and the election of officers for the ensuing year will take place after the clinics the following day.

All ethical members of the profession are cordially invited to be present.

J. B. O'BRIEN, *Ch'm Publicity Committee*,
1404 N. Union Boul'd, St. Louis.

SUSQUEHANNA DENTAL ASSO- CIATION OF PENNSYLVANIA.

THE forty-sixth annual meeting of the Susquehanna Dental Association of Pennsylvania, will be held at the Hotel Oneonta, Harvey's Lake, Luzerne co., Pa., Tuesday, Wednesday, and Thursday, May 18, 19, and 20, 1909.

Drs. Edward C. Kirk, H. C. Ferris, and P. B. McCullough will be among the essayists.

Harvey's Lake, the largest body of water in Pennsylvania, is a beautiful summer resort in the mountains, ten miles from Wilkes-Barre, and not only makes an ideal place for the meeting, but affords unusual opportunities for an outing.

Ethical practitioners of dentistry and medicine are cordially invited to attend and participate in the discussions.

EDMOND J. DONNEGAN, *Recording Sec'y*,
Amsden Bldg., Scranton, Pa.

MISSOURI STATE DENTAL ASSOCIATION.

THE forty-fourth annual meeting of the Missouri State Dental Association will convene at Kansas City, Mo., May 26, 27, and 28, 1909. A good, live program is in course of preparation.

Executive Committee: C. C. Allen, chairman, Kansas City; F. G. Worthly, Kansas City; D. D. Campbell, Kansas City.

J. F. WALLACE, *Corresponding Sec'y.*

GEORGIA STATE DENTAL SOCIETY.

THE forty-first annual meeting of the Georgia State Dental Society will be held at Cumberland Island, Ga., June 1, 2, and 3, 1909. All ethical practitioners are cordially invited.

D. H. MCNEILL, *Cor. Sec'y.*

MASSACHUSETTS DENTAL SOCIETY.

THE forty-fifth annual meeting of the Massachusetts State Dental Society will be held at Boston, Mass., on June 9, 10, and 11, 1909.

W. E. BOARDMAN,
Boston, Mass.

SOUTHERN WISCONSIN DEN- TAL ASSOCIATION.

THE fifteenth annual meeting of the Southern Wisconsin Dental Association will be held in Beloit, Wis., June 3 and 4, 1909.

C. W. COLLIVER, *Sec'y*,
Clinton, Wis.

TEXAS STATE DENTAL ASSO- CIATION.

THE annual meeting of the Texas State Dental Association will be held at Waco, June 10, 11, and 12, 1909.

We call the attention of manufacturers, exhibitors, and visitors to the circuit formed by the three meetings—Missouri (May 26-28), Oklahoma (June 3-5), and Texas as above. By this arrangement it is expected to secure a larger number of prominent men and valuable exhibits than heretofore.

The profession is cordially invited to attend.

J. G. FIFE, *Sec'y*,
Dallas, Tex.

FLORIDA STATE DENTAL SOCIETY.

THE twenty-sixth annual meeting of the Florida State Dental Society will be held in Ocala, Thursday, June 17, 1909, continuing in session three days. A cordial invitation is extended to ethical practitioners.

CARROLL H. FRINK, *Sec'y*,

301-2 Masonic Temple, Jacksonville, Fla.

PENNSYLVANIA STATE DENTAL SOCIETY.

THE forty-first annual meeting of the Pennsylvania Dental Society will be held at Hotel Schenley, Pittsburg, June 29 and 30, and July 1, 1909.

L. M. WEAVER, *Recording Sec'y*.

SOUTHERN CALIFORNIA DENTAL ASSOCIATION.

THE twelfth annual convention of the Southern California Dental Association will convene June 28, 29, and 30, 1909, at the College of Dentistry, University of Southern California, Fifth and Wall sts., Los Angeles, Cal.

CHAS. E. RICE, *Sec'y*.

NORTH CAROLINA DENTAL SOCIETY.

THE thirty-fifth annual meeting of the North Carolina Dental Society will be held at Asheville, N. C., June 23 to 26, 1909. The Battery Park Hotel will be the headquarters.

All ethical practitioners are cordially invited to attend.

J. C. WATKINS, *Sec'y*,
Winston-Salem, N. C.

MAINE DENTAL SOCIETY.

THE forty-fourth annual meeting of the Maine Dental Society will be held at the Peaks Islands House, Portland, Me., June 24, 25, and 26, 1909. It is confidently expected by the Executive Committee that this will be one of the most successful meetings ever held by this society. All ethical practitioners of dentistry are welcome to these meetings.

E. P. BLANCHARD, *Chm'n Ex. Com.*,
Portland, Me.
H. A. KELLEY, *Sec'y*,
Portland, Me.

SOUTH DAKOTA STATE DENTAL SOCIETY.

THE twenty-seventh annual meeting of the South Dakota State Dental Society will be held at Huron, on June 29 and 30, and July 1, 1909.

FERDINAND BROWN, *Sec'y*,
Sioux Falls, S. D.

MICHIGAN STATE DENTAL SOCIETY.

THE fifty-third annual convention of the Michigan State Dental Society will be held at Kalamazoo, on June 29 and 30, and July 1, 1909. An attractive and instructive program is in course of preparation, and a most profitable meeting is assured.

JAMES W. LYONS, *President*,
DON M. GRAHAM, *Sec'y*.

SOUTH CAROLINA STATE DENTAL ASSOCIATION.

THE thirty-ninth annual meeting of the South Carolina Dental Association will be held at Glenn Springs, Monday, June 28th, continuing in session to July 2, 1909. Hotel rates: \$1.50 per day. All ethical practitioners are cordially invited to be present.

P. H. SHEALY, *Cor. Sec'y*,
Lexington, S. C.

INDIANA STATE DENTAL ASSOCIATION.

THE fifty-first annual meeting of the Indiana State Dental Association, to be held at Indianapolis June 29th to 30th and July 1st, will be a profitable meeting to those attending, a meeting that will be noted for its many practical suggestions.

C. D. Lucas, chairman of the Executive Committee, has completed arrangements for six excellent papers, four from our own state and two from special guests outside the state. W. S. Kennedy, supervisor of clinics, promises the largest, the best, and the most practical clinic in our history.

No dentist in Indiana who cares for his mental improvement can afford to miss this meeting. Mark off the dates. Do it now!

OTTO U. KING, *Sec'y*,
Huntington, Ind.

DELTA SIGMA DELTA FRATERNITY

AT SEATTLE EXPOSITION.

THE Seattle Auxiliary wishes to announce the annual Supreme Chapter meeting of Delta Sigma Delta Fraternity in Seattle, on July 21, 22, and 23, 1909. July 24th will be "Delta Sigma Delta day" at the Alaska-Yukon-Pacific Exposition.

C. F. Fiset, *Historian*.

VIRGINIA STATE DENTAL ASSOCIATION.

THE fortieth annual session of the Virginia State Dental Association will be held at The Chamberlin, Fortress Monroe, Va., July 21, 22, and 23, 1909. Every effort is being made to make this the most interesting and successful meeting of our society. Men of national reputation will give clinics and read papers. All ethical practitioners are cordially invited to attend.

W. H. PEARSON, *Cor. Sec'y*,
Hampton, Va.

CALIFORNIA STATE DENTAL ASSOCIATION

AND THE

ALUMNI ASSOCIATION OF THE COLLEGE OF DENTISTRY, UNIV. CAL.

THE California State Dental Association and the Alumni Association, College of Dentistry, University of California, will hold a joint meeting on July 6, 7, and 8, 1909, at the College building, Second and Parnassus aves., San Francisco.

Arrangements are being made for a number of prominent eastern dentists to be present and contribute to the clinics and papers, in addition to members from the state. Dr. John Q. Byram has signified his intention to be present and his work in porcelain will be most instructive.

Manufacturers are being solicited to make exhibits and inasmuch as there will be a series of meetings on the Coast from June 28th to July 23d, it is expected that exhibitors will find it to their advantage to make the circuit.

Reserve these three days for a most profitable meeting; the knowledge gained will amply repay you.

ROBERT E. KEYS,
Com. on Publicity.

NEW JERSEY STATE DENTAL SOCIETY.

THE New Jersey State Dental Society will hold their annual meeting in the Casino, situated on the beach front at Asbury Park, N. J., beginning Wednesday, July 22d, and continuing through the 23d and 24th.

The clinics and exhibits are so large and varied that it has been necessary to secure a large building to accommodate them and the many visitors to the meetings. The Casino is ideally situated, large and cool and well adapted for dental meetings.

The Hotel Columbia has been selected as headquarters for the society, and it offers superior accommodations and low rates for those desiring to attend the meeting. All the principal railroads lead to Asbury Park, with many trains daily, also boat connections to New York for those desiring to travel by water.

All the dental profession should mark off the above dates and spend a delightful three days' vacation attending our meeting.

CHARLES A. MEEKER, *Sec'y*,
29 Fulton st., Newark, N. J.

FIRST AND SECOND DISTRICT (LA.) DENTAL SOCIETIES.

THE First and Second District Dental Societies of Louisiana met in the banquet hall of the St. Charles Hotel for their monthly meeting and annual election of officers, on Wednesday, February 24, 1909.

The following officers were elected: S. H. McAfee, president; E. J. Zeidler, vice-president; E. H. Ramelli, secretary; W. C. Richardson, treasurer. Executive Committee—J. A. Gorman, chairman, C. S. Tuller, and S. S. Grosjean.

E. H. RAMELLI, *Sec'y*.

NORTHERN DENTAL ASSOCIATION OF NEW YORK CITY.

THE Northern Dental Association of New York City met on Tuesday, December 22, 1908, instead of Thursday, December 24th, at the Harlem Casino. The following officers were elected for the term of 1909: J. M. Schwartz, president; Ph. Scheinman, vice-president; N. L. Palinger, treasurer; E. A. Bishop, re-

cording secretary; Wm. N. Sum, corresponding secretary, and Henry Mocenter, editor.

Dr. Wm. N. Sum read a paper on the "Care of Children's Teeth," and a general discussion followed.

The society meets every second and fourth Thursday at its permanent quarters, Harlem Casino, 124th st. and Seventh ave.

WM. N. SUM, *Sec'y*,
1477 Washington ave.

LUZERNE AND LACKAWANNA DENTAL SOCIETY.

At the annual meeting of the Luzerne and Lackawanna (Pa.) Dental Society, held December 15, 1908, in Wilkes-Barre, the following officers were elected for 1909: H. D. Matten, Wilkes-Barre, president; O. B. Richards, Moosic, vice-president; Edmond J. Donnegan, Scranton, secretary; D. S. Gardner, Scranton, treasurer. Board of Directors—J. A. Patten, Carbondale; E. P. Carty, and Thos. H. Imeson, Scranton; A. G. Moorish and F. L. Davenport, Wilkes-Barre.

This society meets monthly on the evening of the third Tuesday, alternately in Wilkes-Barre and Scranton. All ethical dentists are invited to meet with us.

EDMOND J. DONNEGAN, *Sec'y*.

COLUMBUS (OHIO) DENTAL SOCIETY.

AN AMERICAN MEMORIAL TO THE LATE PROF.
DR. WILLOUGHBY DAYTON MILLER.

At a meeting of the Columbus Dental Society of Columbus, Ohio, held Tuesday, March 23, 1909, the following resolutions were adopted:

Whereas, The late Dr. Willoughby D. Miller, who devoted his life to untiring research for the benefit of dental science, was an American and an Ohioan by birth; and

Whereas, It is desired to obtain an expression of opinion from the various dental societies and associations meeting during the interval pending the next meeting of the Ohio State Dental Society (December 1909); therefore, be it

RESOLVED, That the Columbus Dental Society of Columbus, Ohio, suggest the advisability of raising a fund for a suitable me-

morial by the dental profession of America, to commemorate the life and work of the said Dr. Willoughby D. Miller; said memorial to take such form as may be determined by the consensus of opinion by the various dental organizations of this country; and be it further

RESOLVED, That the Ohio State Dental Society, at its next annual meeting, be requested to take charge of the Miller American Memorial matter and of such correspondence as may be received pertaining to the same.

H. V. COTTRELL, *President*,
GILLETTE HAYDEN, *Sec'y*.

ROTTERDAM DENTAL SOCIETY.

THE "GNATHODYNAMOMETER" PRIZE COMPETITION.

THE Board of the Rotterdam Dental Society, 115 Aert Van Nesstraat, Rotterdam, hereby announces that the jury charged with examination of the prize essays upon a "Gnathodynamometer" already sent in have not awarded the prize to any one of the competitors, as the instruments submitted do not satisfy the requirements prescribed by the board.

M. ISEBREE MOENS, *Sec'y*.

ARMY DENTAL CORPS.

CHANGES in duty and stations of dental surgeons of the U. S. army for the month ending April 10, 1909:

George I. Gunkel, ordered to Fort Caswell, N. C., for temporary duty.

Samuel W. Hussey, ordered to visit successively, for temporary duty, Forts Wayne and Brady, Mich.

William H. Ware, relieved from duty in the Philippines Division and ordered to the United States; granted leave of absence for three months.

Ralph W. Waddell, granted leave of absence for one month and eighteen days.

Alden Carpenter, ordered to Fort Slocum, N. Y., for temporary duty.

Leave for two months with permission to visit Japan, Korea, and China is granted Examining and Supervising Dental Surg. S. Marshall, effective on or about March 14, 1909. (Feb. 11, Phil. D.)

NATIONAL DENTAL ASSOCIATION.

THE thirteenth annual meeting of the National Dental Association, held at Birmingham, Ala., March 30th to April 2d, was a most successful session with a good attendance. The papers and discussions were exceedingly interesting and held the close attention of large audiences throughout.

Official action was taken providing for a National Dental Journal, commencing October 1910.

The Committee on Revision of Constitution and By-laws presented a number of amendments embodying a liberal plan of reorganization. Copies carrying the proposed changes are to be printed and mailed to the membership at an early date, which will give ample opportunity to thoroughly understand same before final action is taken.

The following officers were elected: Burton Lee Thorpe, St. Louis, Mo., president; W. T. Chambers, Denver, Colo., vice-president for the West; Chas. W. Rodgers, Boston, Mass., vice-president for the East; Thos. P. Hinman, Atlanta, Ga., vice-president for the South; H. C. Brown, Columbus, Ohio, corresponding secretary; Chas. S. Butler, Buffalo, N. Y., recording secretary; A. R. Melendy, Knoxville, Tenn., treasurer. Executive Committee (new members for three years)—C. M. Work, Ottumwa, Iowa; V. H. Jackson, New York city, and W. G. Mason, Tampa, Fla. Executive Council—H. J. Burkhart, Batavia, N. Y.; B. Holly Smith, Baltimore, Md.; A. H. Peck, Chicago, Ill.; W. E. Boardman, Boston, Mass., and C. L. Alexander, Charlotte, N. C.

Denver, Colo., and the third Tuesday of July 1910, were chosen as the place and date of the next meeting.

H. C. BROWN, *Cor. Sec'y*,
Columbus, Ohio.

ARKANSAS BOARD OF EXAMINERS.

THE next meeting of the Arkansas State Board of Dental Examiners will be held in Hot Springs, May 24 and 25, 1909. All applicants are required to pass an examination to obtain a certificate. Examination fee \$15.00.

A. T. McMILLIN, *Sec'y-Treasurer*,
Little Rock, Ark.

TENNESSEE BOARD OF EXAMINERS.

THE next regular annual meeting of the Tennessee State Board of Dental Examiners will be held at Nashville, Tenn., May 18 to 21, 1909. Examinations will be held in all branches taught in dental colleges. All applicants for examination must present diplomas from reputable dental colleges, and applications for examination should be made to the secretary ten days prior to the meeting. Examination fee, \$10.00.

F. A. SHOTWELL, *Sec'y-Treasurer*,
Rogersville, Tenn.

ILLINOIS CIVIL SERVICE COMMISSION.

EXAMINATIONS FOR DENTAL INTERNE.

EXAMINATIONS for dental interne will be held May 6, 1909, in Chicago, Springfield, and Belleville. They will be open to men and women over twenty-one years of age. Scope and weights: Technical questions on anatomy of the head and neck, dental anatomy, operative dentistry, prosthetic dentistry, dental pathology, oral surgery and oral hygiene, 7; experience, 3.

Requests for applications should be addressed to the Illinois Civil Service Commission, Springfield. All applications must be filed by May 1.

JOSEPH C. MASON, *Chief Examiner*,
Springfield, Ill.

ALABAMA BOARD OF EXAMINERS.

THE Alabama Board of Dental Examiners will meet in Anniston, Ala., on the Monday before the second Tuesday in May 1909. In addition to the regular written examination, the following requirements will be added: Each applicant must fill at least two teeth, approximal cavities, one with gold, the other with alloy, the work to be done under the immediate supervision of the board, the latter to determine or pass on suitable selections of cavities. The board will try to furnish subjects, but failing to do so, applicants for license must find or bring their own subjects, also instruments and material.

Each applicant must take or have taken an impression of his own mouth, make a

plaster cast of the same, cut from the cast the six anterior teeth, and make a bridge for the same with porcelain facings. Cast can be made and facings fitted before the examination, but the backings must be put on and facings arranged, also invested and soldered, under the supervision of the board, hard solder being required.

THOS. P. WHITBY, *Sec'y.*

MARYLAND BOARD OF EXAMINERS.

[NOTE DATE—CORRECTED.]

THE Maryland Board of Dental Examiners will meet for examination of candidates for certificates May 27 and 28, 1909, at the Dental Department of the University of Maryland, Baltimore, at 9 A.M.

Applicants must pass a written examination in anatomy and physiology, chemistry and bacteriology, oral surgery, operative and prosthetic dentistry, and pathology, therapeutics, and materia medica; must insert a gold filling in the mouth and submit a plate or bridge of not less than four crowns, parts being assembled and invested in advance, and soldered in the presence of the board.

Application blanks properly filled out under oath, accompanied by the fee of ten dollars, must be filed with the secretary prior to May 27th.

F. F. DREW, *Sec'y,*
701 N. Howard st., Baltimore, Md.

CALIFORNIA BOARD OF EXAMINERS.

THE next examination by the Board of Dental Examiners of California will be held in Los Angeles, beginning on June 3d. This will be followed by an examination in San Francisco beginning on June 15th.

C. A. HERRICK, *Sec'y.*

NEW HAMPSHIRE BOARD OF REGISTRATION.

THE next meeting of the New Hampshire Board of Registration in Dentistry for examination will be held June 1, 2, and 3, 1909, at Masonic Banquet Hall, Manchester, N. H.

A. J. SAWYER, *Sec'y,*
Manchester, N. H.

MINNESOTA BOARD OF EXAMINERS.

THE Minnesota State Board of Dental Examiners will hold a special meeting for the purpose of examining applicants for license on June 7, 1909. Meetings will be held at the Dental Department of the state university in Minneapolis, Minn. All applications must be in the hands of the secretary by May 28th.

For blanks and further information address

GEO. S. TODD, *Sec'y,*
Lake City, Minn.

KENTUCKY BOARD OF EXAMINERS.

THE Kentucky State Board of Dental Examiners meets the first Tuesday in June at 8 A.M. in the Louisville College of Dentistry for the examination of applicants for certificates.

All applicants must be graduates of a reputable dental college. On request, the secretary will furnish application blanks for examination, which, with the fee of \$20, must be in his hands ten days before the date of examination.

J. RICHARD WALLACE, *Sec'y.*
The Masonic, Louisville, Ky.

ILLINOIS BOARD OF EXAMINERS.

THE next regular meeting of the Illinois State Board of Dental Examiners for the examination of applicants for a license to practice dentistry in the state of Illinois will be held in Chicago at the Chicago College of Dental Surgery, S. E. corner Wood and Harrison sts, beginning Thursday, June 10, 1909, at 9 A.M.

Applicants must be in possession of the following requirements in order to be eligible to take the examination: (1) Any person who has been engaged in the actual, legal, and lawful practice of dentistry or dental surgery in some other state or country for five consecutive years just prior to application; or (2) is a graduate and has a diploma from an accredited high school, or a certificate signed by a state superintendent of public instruction or his duly authorized deputy or equivalent.

lent officer, acting within his proper or legal jurisdiction, showing that the applicant has a preliminary education equal to that obtained in an accredited high school, and is a graduate and has a diploma from the faculty of a reputable dental or medical college, school, or dental or medical department of a reputable university, and possesses the necessary qualifications prescribed by the board.

Candidates will be furnished with proper blanks and such other information as is necessary on application to the secretary. All applications must be filed with the secretary five days prior to the date of examination. The examination fee is twenty dollars, with the additional fee of five dollars for a license.

Address all communications to

J. G. REID, *Sec'y*,
1204 Trude Bldg., Chicago, Ill.

IDAHO BOARD OF EXAMINERS.

THE Idaho State Board will meet in Boise, June 21 to 23, 1909. Applicants should bring operating instruments and engine.

E. L. BURNS, *Sec'y*,
Boise, Idaho.

CONNECTICUT DENTAL COMMISSIONERS.

A MEETING of the Dental Commissioners of the State of Connecticut will be held on Thursday, Friday, and Saturday, June 24, 25, and 26, 1909, at Hartford, Conn., to examine applicants for license to practice dentistry.

GILBERT M. GRISWOLD, *Recorder*.

INDIANA BOARD OF EXAMINERS.

THE next regular meeting of the Indiana State Board of Dental Examiners will be held in the State-house in Indianapolis, beginning Monday, June 7, 1909, and continuing four days. All applicants for registration in this state will be examined at this time. This will be the last meeting of the year 1909. For further information and instruction address

F. R. HENSHAW, *Sec'y*,
Middletown, Ind.

PENNSYLVANIA BOARD OF EXAMINERS.

THE Pennsylvania Board of Dental Examiners will conduct examinations simultaneously in Philadelphia and Pittsburgh, June 9, 10, 11, and 12, 1909. For application papers, or any other information, write to Dr. Nathan C. Schaeffer, secretary Dental Council, Harrisburg, Pa.

W. D. DeLONG, *Sec'y*.

IOWA BOARD OF EXAMINERS.

THE next meeting of the Iowa State Board of Dental Examiners for examination will be held at Iowa City, beginning June 7, 1909, at 9 A.M.

Practical examinations will be held in both operative and prosthetic dentistry. Applications must be in the hands of the secretary by June 1st.

For further information address

E. D. BROWER, *Sec'y*,
LeMars, Iowa.

TEXAS BOARD OF EXAMINERS.

THE regular meeting of the Texas State Board of Dental Examiners will be held in Waco, Texas, beginning at 9 A.M., Monday, June 14, 1909.

Diplomas not recognized or registered; examinations are required of all. No interchange of license with any other state. No special examination to practitioners already in practice. Applications, accompanied by a fee of \$25, should be in the secretary's hands by June 10th. For further information address

BUSH JONES, *Sec'y*,
Dallas, Texas.

VERMONT BOARD OF DENTAL EXAMINERS.

THE next meeting of the Vermont Board of Dental Examiners for the examination of candidates to practice dentistry will be held at Montpelier, July 13 to 15, 1909.

Headquarters will be at the Pavilion Hotel. Application, together with fee, \$25, must positively be in the hands of the secretary before July 1st.

Application and other blanks required, including information, can be had of

J. HOLMES JACKSON, *Sec'y*,
Burlington, Vt.

NEBRASKA DENTAL BOARD.

THE Nebraska Dental Board of Examiners will hold the next regular examination at the State-house, Lincoln, June 21, 22, and 23, 1909. For further information address

H. C. BROCK, *Sec'y*,
North Platte, Nebr.

NORTH CAROLINA BOARD OF EXAMINERS.

THE North Carolina State Board of Dental Examiners will meet at 10 A.M. Friday, June 18, 1909, in Asheville, N. C. All applicants must be graduates of a reputable dental college, and will be required to present diplomas for inspection, and register on or before the above date.

For further information address

R. H. JONES, *Sec'y*.

RHODE ISLAND BOARD OF REGISTRATION.

THE Rhode Island Board of Registration in Dentistry will meet for the examination of candidates at the State-house, Providence, R. I., Tuesday, Wednesday, and Thursday, June 22, 23, and 24, 1909. Application blanks and particulars may be obtained from

HARRY L. GRANT, *Sec'y*,
10 Weybosset st., Providence, R. I.

FLORIDA BOARD OF EXAMINERS.

THE next annual meeting of the Florida State Board of Dental Examiners will be held in Ocala, Fla., June 14, 1909, at 9 A.M.

Applicants for certificates to practice dentistry in this state will be required to exhibit diplomas from reputable dental colleges, and take examination, both theoretical and practical. The theoretical will embrace all subjects taught in the dental colleges; the practical, examination on both operative and prosthetic dentistry. Board will furnish head-rests and blowpipe. Applicants must furnish other necessary instruments. Each applicant must furnish photograph with application. Any further information will be furnished on application.

W. G. MASON, *Sec'y*,
Tampa, Fla.

SOUTH CAROLINA BOARD OF EXAMINERS.

THE next meeting of the South Carolina State Board of Dental Examiners will be held at Glenn Springs, near Spartanburg, S. C., beginning on Friday, June 25, 1909. All applicants for license must be present and register for examination on that day. For further information address

B. RUTLEDGE, *Sec'y*,
Florence, S. C.

OHIO STATE DENTAL BOARD.

THE Ohio State Dental Board will meet in Columbus, June 15 to 18, 1909, for the examination of applicants for license.

Only graduates of reputable dental colleges are eligible. All applications, together with the fee of \$25.00, should be in the hands of the secretary not later than June 5th.

For further information and blank applications address

F. R. CHAPMAN, *Sec'y*,
305 Schultz Bldg., Columbus, Ohio.

MICHIGAN BOARD OF EXAMINERS.

THE next meeting of the Michigan State Board of Examiners for the examination of candidates for license to practice dentistry in Michigan will be held at the Dental Department of the University of Michigan in Ann Arbor, beginning Monday morning, June 14, at nine o'clock. Applications must be in the hands of the secretary at least fourteen days before the examination. Application blanks and rules governing examinations will be furnished by any member of the board.

A. B. ROBINSON, *Sec'y-Treasurer*.

MAINE BOARD OF EXAMINERS.

A MEETING of the Maine Board of Dental Examiners will be held at the Common Council Rooms, 53 Market st., Portland, on Monday, June 21, 1909, at 2 P.M. Theoretical examinations will be in writing. Practical examination will include operations in crown work and the insertion of fillings of cohesive and of non-cohesive gold foil.

All applications, together with the fee of twenty dollars, must be in the hands of the secretary on or before Monday, June 14th.

DANA W. FELLOWS, *Sec'y*,
Portland, Me.

WISCONSIN BOARD OF EXAMINERS.

THE next annual meeting of the Wisconsin State Board of Dental Examiners will be held in the Dental Department of the Marquette University, at Milwaukee, Wis., beginning June 21, 1909.

F. A. TATE, *Sec'y.*

NEW JERSEY BOARD OF REGISTRATION.

THE New Jersey State Board of Registration and Examination in Dentistry will hold their semi-annual examination in the Assembly chamber of the State-house, Trenton, N. J., beginning Tuesday, July 6, 1909, and continuing through the 7th and 8th.

Practical examinations will be held on the 6th, theoretical examinations on the 7th and 8th. Practical work consists of soldering a gold or silver plate, one gold filling, and one amalgam filling. The gold filling must be an approximal one, with an approximating tooth in position.

Candidates are requested to bring their patients. Photograph and preliminary credentials must accompany the application. Sessions begin promptly at 8 A.M., each day.

Applications must be in hands of the secretary ten days prior to the examination.

CHARLES A. MEEKER, D.D.S., *Sec'y*,

29 Fulton st., Newark, N. J.

SOUTH DAKOTA STATE BOARD OF EXAMINERS.

THE next meeting of the South Dakota State Board of Dental Examiners will be held at Sioux Falls, S. D., July 13, 1909, beginning at 1:30, and continuing for three days.

Both practical and written examination will be required of all candidates, and all applications, together with the examination fee of twenty-five dollars, must positively be in the hands of the secretary not later than July 5th, otherwise they will not be admitted to examination.

G. W. COLLINS, Vermillion, S. D.

UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING MARCH 1909

March 2.

No. 913,720, to J. R. GAMMETER. Apparatus for vulcanizing.

March 9.

No. 914,415, to E. HUBBELL. Tongue-depressor.

No. 914,501, to D. McEACHEON. Tooth-brush.
No. 915,025, to W. N. GREER. Head-rest.

March 16.

No. 915,137, to WM. WEICHELBAUM. Dental plugger.

No. 915,349, to JESSE L. HIRTZ. Tooth-brush.

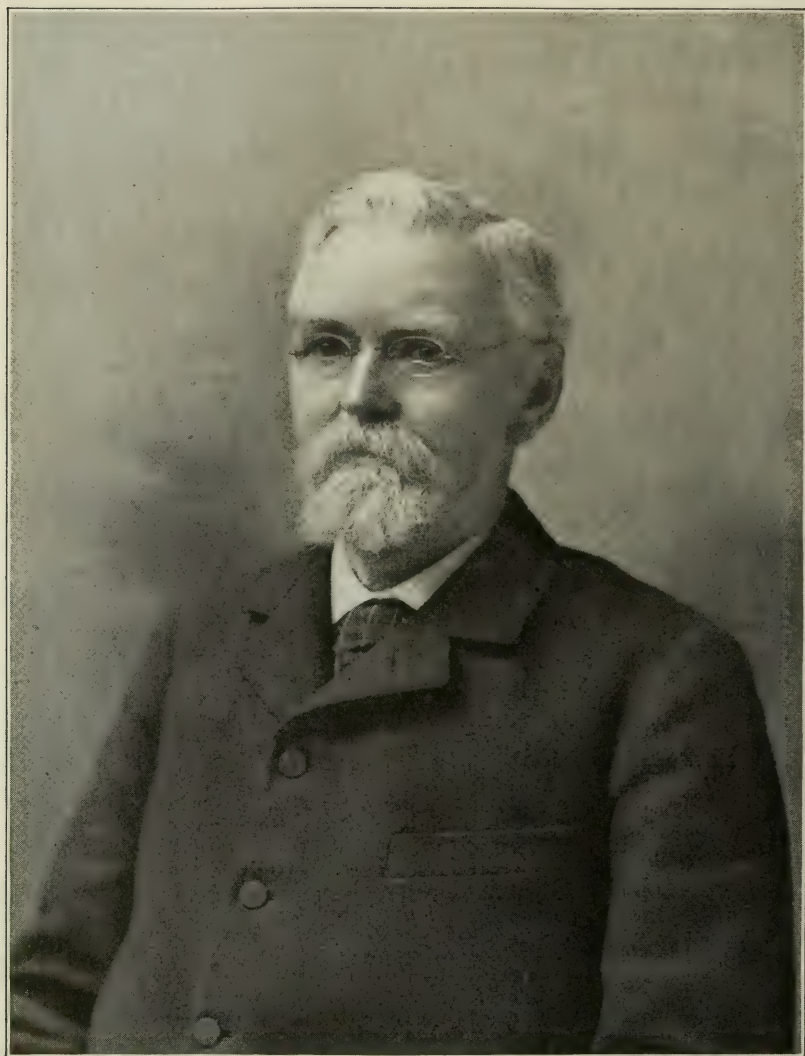
March 23.

No. 915,917, to P. L. WILBUR. Syringe.

No. 916,387, to W. G. CHURCH. Plugger.

March 30.

No. 916,856, to R. H. GALLAGHER and R. E. DUTCHER. Dental instrument.



DR. C. N. PEIRCE.

THE DENTAL COSMOS.

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JUNE 1909.

No. 6.

ORIGINAL COMMUNICATIONS.

PRELIMINARY NOTE ON THE VASCULAR SUPPLY OF THE MANDIBLE.

By M. H. CRYER, M.D., D.D.S., Philadelphia, Pa.,

PROFESSOR OF ORAL SURGERY, DEPARTMENT OF DENTISTRY, UNIVERSITY OF PENNSYLVANIA.

(Read before the Dental Society of the State of New York, at its annual meeting, Albany, May 6, 1909.)

THE mandible is perhaps more richly supplied with blood than any bone in the body. On either side its principal artery is the inferior dental, a large branch of the internal maxillary. The artery enters the bone at the inferior dental foramen, situated at the middle of the inner side of the ramus. It then passes downward and forward through the body of the bone to the symphysis, and anastomoses with the one from the opposite side at a point near the incisor teeth; a great portion of it curves upon itself and passes out through the mental foramen, anastomosing with the submental, inferior labial, and inferior coronary branches of the facial artery. In this manner two complete circles of collateral circulation are formed on the two sides. The mandible is also well supplied through the periosteum of the body or true bone, and the muco-periosteum of the alveolar process. The vessels from

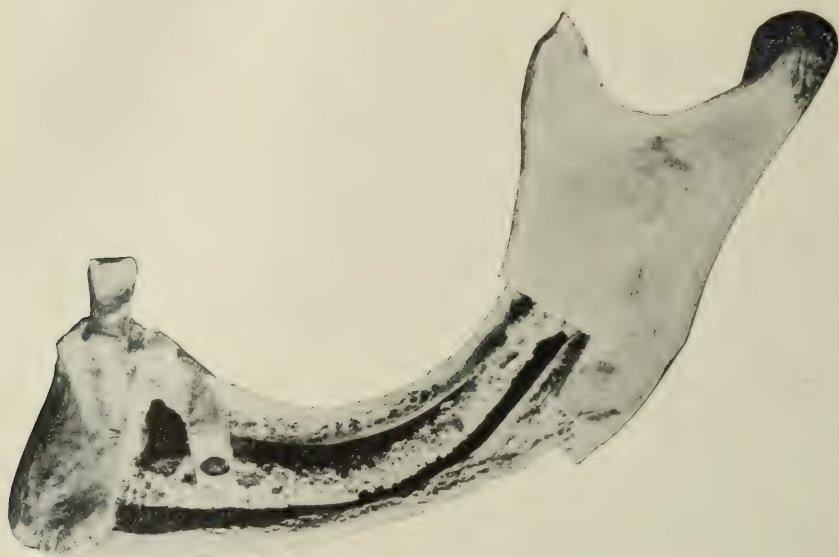
these sources pass into the bone and have free anastomotic relations with the internal supply of blood.

In 1895, at a meeting of the American Dental Association, I exhibited a specimen of a mandible that showed a canal or cribriform tube passing from the inner side of the ramus downward and forward through the body of the bone almost as far as the lateral incisor teeth, at which point it curved backward, forming a mental canal and terminating in the mental foramen. The specimen also demonstrated that from the main tube a branch tube is given off to each tooth-root; there is but one exception in this specimen, namely, where one small tube bifurcates into two tubes which go to two teeth. (See Fig. 1.) Soon afterward I exhibited a specimen which contained within the tube the nerve and vessels, and showed that the same tissue passed along the tube, dividing where the small tubes

were given off, and passing along them to the teeth. (Fig. 2.)

been broken away leaving the soft tissue uncovered on three sides. (Fig. 3.)

FIG. 1.



Another dissection exhibited was made by grinding away the labial and lingual surfaces of the bone and teeth until the pulp-chambers and apical foramina were

A few weeks ago I had the lower jaw of a mature dog injected with mercury through the inferior dental artery, after which Dr. Pancoast, of the X-ray de-

FIG. 2.



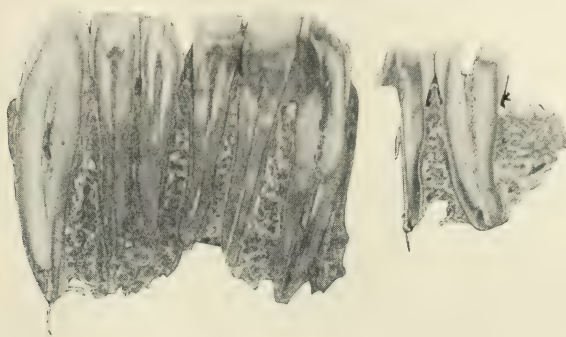
exposed on both sides of the teeth, leaving the nerve and vascular tissue extending out of the foramina and through a portion of the small cribriform tube below. In one tooth the lateral wall has

partment of the University of Pennsylvania Hospital, made a stereoscopic radiogram for me. Fig. 4 gives one-half of the radiogram; it shows that the mercury passed through the inferior dental

artery to all portions of the bone, the alveolar process, and the teeth, and dem-

the inferior dental artery as it passes along its canal to the roots of the teeth

FIG. 3.



onstrates the complete anastomotic relations which the arteries have to each

and the intermediate tissue. It demonstrates that any portion of the artery

FIG. 4.



other. Under the stereoscope it also shows that branches are given off from

can be removed without destroying the vitality of any tissue of the jaw, provided

that the artery be not destroyed between the structures and the nearest branch of collateral circulation. This illustration demonstrates that in order to destroy

cation with the sensorium. It matters not whether it be thermal changes in a tooth or dust in the eye, when the fifth nerve is thus crippled by resection or by

FIG. 5.

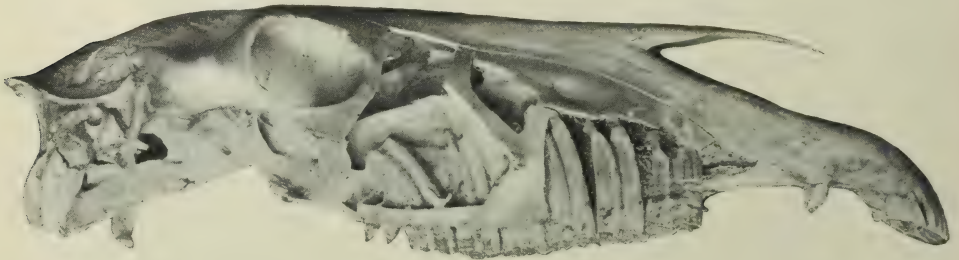


the vitality of a tooth the blood supply would have to be cut off immediately at the apical foramen.

There is one other point I would like to mention: A tooth that does not "respond" to thermal changes, or even to

the removal of the Gasserian ganglion, the wise surgeon protects the parts from injury. When the eye is concerned he covers it with some transparent substance so that dust cannot injure it. A tooth under similar conditions should

FIG. 6.



the electric current, is not necessarily a devitalized tooth. In operations for neuralgia the surgeon often removes a great portion of the inferior dental vessels and nerve, or he may remove the Gasserian ganglion, but in so doing he does not destroy the vitality of the tissue supplied. He destroys the function of communi-

also be protected and not subjected to "test." In time it will regain its sensation, provided meddlesome surgery has not destroyed the pulp. In the application of ethyl chlorid on the gums to produce an anesthetic condition for lancing an abscess, great care should be taken to protect any vital tooth, for there is

danger of producing devitalization of the tooth by freezing.

In dissecting mandibles of various lower animals, both boiled bones and those in the fresh state, I find that those of man give the best idea of a typical cribriform tube and its branches. In the dog and the horse I have found but a slight trace of the tube, while in the ox the tube has been found extending from the inferior dental foramen to near the incisor teeth. (Fig. 5.) Between the tube and the apices of the roots of the teeth are shown quite a number of small cribriform bony tubes or canals which in the living state protect the nerves and vessels of the teeth and surrounding tissue. Between these masses of cribriform bone tissue, which extend from

the main tube to the points of the roots of the teeth and then upward and around the teeth, forming their sockets, there are large open spaces which in the recent state contain yellow marrow.

In the upper jaw of many of the lower animals, especially the ruminants, the horse, and the hog, the infra-orbital canal acts toward the surrounding bone and the teeth in a manner analogous to that of the inferior dental canal or tube in the lower jaw. It is more or less cribriform in character, giving off branches of cribriform tubes going to the apices of the teeth and to the surrounding tissue of each tooth, very often in bunch-like masses. See Fig. 6, which is taken from a horse.

EXTRACTION OF TEETH: LOCAL ANESTHESIA.

By JOHN D. THOMAS, D.D.S., Philadelphia, Pa.

THE condemnation of a tooth that is to be extracted is today regarded by many practitioners as deplorable in the extreme, and by some as an act akin to malpractice.

The tremendous strides made within the memory of men still active in the practice of dentistry in the treatment and preservation of the natural teeth would warrant the conclusion that with strict co-operation on the part of the patient the system of practice as now advocated will result in practically saving these organs, so that extraction need seldom be resorted to; and if the desires and hopes of the earnest men who are diligently working out the principles and the system of prophylaxis and other means of treatment are successful, a great achievement will have been consummated. Indeed, the whole practice of dentistry will be revolutionized. Instead of devoting our time to the discussion of the best materials for filling teeth and the most

effective methods of root and canal treatment, we shall become a profession of stomatologists in all that the word implies, exerting our energies in the prevention of the approach of decay or disease and devoting ourselves to the preservation of absolutely healthy conditions in the mouth, thereby exercising a controlling influence upon the health of the patient far exceeding in usefulness the claims of any other specialists in the healing art.

Unfortunately, the education of the general public is of slow progress, and we must meet conditions as we find them. It is difficult to impress the individual of even more than average intelligence with the importance of constant professional advice and treatment when he is in perfect or comparative comfort, just as he can hardly be persuaded that it is necessary for him to place himself under a physician's constant care when he "feels well." Consequently the num-

ber of dentists who do not meet the misfortune of having to recommend the extraction of a tooth at some time in their practice is very limited, and the legion of others may reconcile their consciences to the fact that such an extraction is not due to their fault, but to personal neglect on the part of the patient.

This abhorrence on the part of the profession of having a patient lose a tooth, and the infrequency of their recommending extraction, account in a measure for the neglect shown as to the importance of the operation of extraction and the conditions which warrant such procedure. The tooth is condemned, its extraction advised, and the subject is dismissed as one to be forgotten, and yet, as a result of the long and persistent effort to save the tooth, conditions are brought about in very many cases where the operation of extraction does not terminate the disease, and further treatment becomes necessary. In this respect, if in no other, this branch of the profession becomes one of the most important and one which is at its best in the hands of the specialist.

From time immemorial the operation of extraction has been regarded by the public as the quickest and surest means of affording relief from toothache, and notwithstanding the able efforts of the dental profession to impress the people with the fact that there are better and more reasonable means of affording relief, we are made to feel that as yet appreciation seems feeble, as is shown by the results.

If there are, as has been estimated, but about 25,000 dentists in this country, they are able to render their services to a comparatively small percentage of our 85,000,000 inhabitants; it would therefore be impossible to claim that a dentist should not extract teeth, and he is not to be condemned for doing so. As a matter of fact, as the people become progressively enlightened on the benefits to be derived from the services of the dentist, not only in the preservation of their natural teeth but in their replacement by artificial dentures, and as this enlight-

ening influence is forced upon the mind and conscience of the public and permeates all walks of life, there will be more teeth to be extracted and more artificial teeth and crowns to be made than ever before in the history of our profession, so that the prosthetic specialist and the extracting specialist should share equally in working for the common weal—working for the greatest good to the greatest number.

The operation of extraction is one of the most important in practice, requiring thorough knowledge of the anatomy and the characteristics of the surrounding structure as well as the physical formation of the tooth, and demanding peculiar skill in its performance; for the writer has no hesitation in saying that even under the most favorable circumstances it is the most brutal operation in surgery, one which is met by the most fearless and heroic patient with feelings of the greatest dread, and one which because of the uncertainty of the final outcome is approached by the majority of dentists with feelings of trepidation. No service is ever rendered to a patient which calls forth such expressions of appreciation as the successful extraction of a tooth, and there is none that will create more condemnation and do more to injure a dentist's reputation than failure in extracting.

In our larger cities it is a recognized custom for dentists to recommend their cases for extraction to someone who makes a specialty of this particular branch, which works greatly to the advantage of all concerned. It relieves the dentist from what is regarded as a disagreeable intrusion upon his general work, and gives the patient the benefit of the skill acquired by one who by constant practice becomes peculiarly expert in the operation. Thus it is that the specialist in extracting bears the same relation to the regular practitioner of dentistry as the surgeon holds to the regular practitioner of medicine. When the physician meets a case requiring surgical interference he calls upon the surgeon, and though perhaps a majority of dentists do the same, it will be greatly

to the advantage of all concerned when the custom becomes universal.

Eliminating the extractions performed for the general public who are not under dental care and who seek relief from toothache by the only means known to them, and speaking only of those who are regular patients, experience causes one to note that the operation of extracting is today a very different proposition from what it was twenty years ago. In those days the time of the society meeting was occupied by discussion upon the best materials for filling teeth; its scope was confined to the narrow limit of the better qualification of cohesive or non-cohesive gold, with some side expressions of opinions upon amalgam, and the belief was freely expressed that a tooth that was not worth filling with gold was not worth filling at all. We can readily recall the time and energy spent in building big gold fillings and the exhaustion of both patient and dentist, and we live to lament the martyrs to the cause. In those days extracting was a comparatively simple operation, for it was of rare occurrence that a cavity extended down to the bifurcations, and even if it did the roots were still strong, so that it was seldom necessary to cut with the forceps little if any below the margin of the alveolar process, and after-treatment was uncalled for, except in cases of abscess where the inflammation had progressed beyond the immediate region of the tooth. What a difference in these days, when it is considered by some almost a crime to order extraction, and treatment is continued with the idea so freely taught that all teeth and roots can and should be saved! Teeth are filled as long as there is anything left of the crown to form a wall for the retention of a filling; if the walls are gone, the canals of the roots are bored and reamed for the placing of posts for crown and bridge work, until there remains but a very thin root wall sometimes up to the apex. Therefore, when extraction becomes imperative, which eventually is invariably the case, the operation becomes one of serious moment. Herein lies the importance of the services

of the specialist in extraction. By his experience and expertness he is able to perform the operation with far less injury to the surrounding bony structure and tissues than one of limited practice would inflict, and is capable of instituting such after-treatment as is necessary, for it is folly to think that such teeth and roots can be taken out without the patient experiencing inflammation and soreness following such an operation. That such after-effects be cared for is as essential as it is that the surgeon look after his patient after an amputation or any other operation.

Extracting operations are serious enough when the roots are found to be straight, smooth, and conical in shape, and if all teeth were of this character the operation of extraction would be comparatively simple—one in which the traumatic effects would be easily managed; but experience proves that this is not the rule. The great majority of teeth have enlarged, diverted, or curved roots which add complications to the ordeal and render after-care and treatment most essential. Bearing in mind that force must necessarily be applied in all cases of extraction—and in many of them extraordinary force—it is the object of the operator to so apply this force as to cause as little injury to the surrounding parts as possible, the patient having to bear and suffer the consequences.

This correct application of force is best accomplished by having the beaks of the forceps so constructed that they will fit the root, and by having the edges so sharp that they will cut through the process without unnecessary bruising, for in order to successfully extract such roots as above described the forceps must be pushed under the gum and over the process to a depth equal to the extent of the boring, because the solid portion of the root must be grasped before any effort can be applied for its removal. In cases where the roots are enlarged by exostosis, or in cases of curved and diverted roots, the operator will at once recognize the difficulty, and by his peculiar sense of touch, which becomes very acute as it is

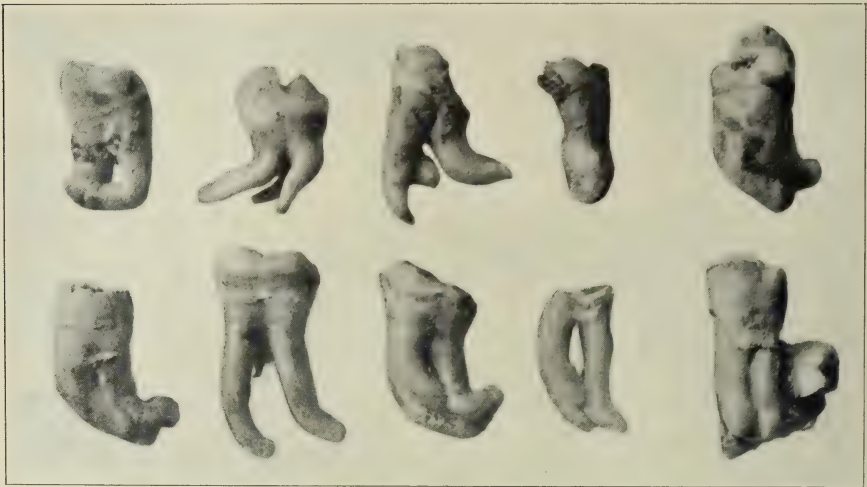
cultivated by experience, will apply the force necessary in the direction of least resistance, so that the effect of the strain will be reduced to a minimum.

These patients come not in order to be relieved from suffering from pulpitis, for their teeth are pulpless (indeed the system of treatment today seldom recommends extraction for exposure of the pulp except in superfluous third molars), but are suffering from inflammation of the lining membrane, ranging from in-

large collection of carious and abnormally developed teeth met in daily practice, will serve to illustrate what I have endeavored to bring to the attention of the reader.

The impossibility of successfully treating chronic abscess upon roots of this character being apparent, Dr. D. N. McQuillen suggests the use of the X ray in order to determine by correct diagnosis the existing conditions, and advises early extraction. The specimens repro-

FIG. 1.



ipient pericementitis to regular abscess, extending to osteitis and often to necrosis, and notwithstanding all the care that may be concentrated upon the operation, the effect of the extraction is to temporarily increase the inflammation, sometimes causing intense suffering, after-treatment of which becomes requisite until the healing process is well established. This is particularly so in cases of alveolar abscess which have progressed to the condition of osteitis, which causes exudation of serumal matter, thereby producing what Dr. Jack has termed dry socket, or bare bone upon which reconstructive granulation will not take place until the inflammation has receded and healthy conditions are brought about.

The specimens here reproduced (Fig. 1), which were taken at random from a

duced are extreme, but distortions run the whole gamut from straight and conical to those here shown, and account for the difficulty which is met in many cases by the dental practitioner who tries to conquer chronic abscess. When the disease has progressed to the point of separating the membrane from the apex the tooth may be counted among the lost, for no means has yet been devised by which the points of such roots can be so successfully treated through the canal that a union between living and dead tissue is effected. It is a principle in surgery that when a foreign substance in the human economy is causing degeneration, disintegration, and necrosis of its environment, amputation is a necessity.

Just here I am constrained to say a

word about the prolonged treatment and persistent retention of such teeth in the mouth, the consequences of which are worthy of serious consideration. In view of the damaging results demonstrated by practical experience it becomes a question whether such a course has not been pursued in many cases with too great enthusiasm.

Unfortunately, the disease at the root of a tooth does not confine its influence to the peridental membrane and the root, but involves its associated surroundings. The process and bone offering less resistance, it is not uncommon to find the degenerative action extending to complete disintegration of the septum between it and the adjoining teeth both in front and back, also the buccal and lingual plates, extending in depth in the mandible until the inferior dental nerve in the lower molars becomes exposed and the whole floor of the antrum in cases of the upper molars is involved. This does not mean cases of regular abscess, where the limit of inflammation is doubtful, where you may look for a sequestrum to form and where gradual exfoliation may take place, but cases in which a prolonged state of irritation has been allowed to exist before extraction is consented to or recommended. The healing is always sluggish, and stimulating treatment is essential to overcome the peripheral inactivity. Accompanying these conditions we meet concomitant affections such as neuralgia extending over the region of the ramification of the great fifth pair of nerves, and its associated effects, including impaired vision, partial deafness, and infected lymphatics. Dr. S. McCuen Smith, a noted rhinologist of this city, in a paper read before the Stomatological Society, calls attention to numerous cases that occurred in his practice of affections of the eye, ear, nose, and throat, directly traceable to a diseased tooth or teeth, and quotes Sexton of New York as reporting a record of 1500 cases of diseases of the ear one-third of which owed their origin to the teeth.

Dr. J. Foster Flagg, who may be considered the father of the practice of

saving all teeth and roots of teeth, was very conservative in his own practice, and the records of the writer's office will show that he recommended more extractions than any of his contemporaries. He was very enthusiastic in his efforts to save teeth, but he was also very quick to order the extraction of a root which did not readily respond to treatment and showed evidence of involving in disease the surrounding structures.

The desire to save a tooth has led some practitioners, after all else has failed, to advocate the amputation of the offending portion of the root and to curette the necrosed portion of the bony surroundings. Theoretically this operation should accomplish its object, and would no doubt do so if we could be sure of cutting away just to the line where the peridental membrane has not lost its attachment, and if the necrotic area has not extended too far. In the experience of the writer the efficacy of this operation is doubtful and in many cases dangerous. In the teeth posterior to the inferior dental foramen the space between the apices of the second bicuspid and molars and the inferior dental canal is in most cases too small to admit of the indiscriminate use of a bur without injury to that nerve. In the corresponding teeth in the upper jaw the operation is no less inadmissible. It is not uncommon to find the roots of the first and second molars projecting into the antrum, and though it is less frequent it is not of rare occurrence that the second bicuspid and third molar do the same.

Recognizing this close proximity of the posterior teeth in the mandible to the inferior dental canal, and the fact that diseased teeth have been allowed to remain long enough to bring about by necrosis the complete exposure of the inferior dental nerve and blood-vessels, the certainty of severing the nerve and bloodvessels becomes absolute, with concurrent paralysis of the lip and chin anterior to and about the dental foramen. In a paper read to the Central Dental Association of New Jersey, Dr. Robert T. Oliver, examining and supervising surgeon of the United States

army, says that this paralysis is only temporary, and sensation will be completely restored "in a few years," which is undoubtedly true.

There is one important point in this connection which has been overlooked. When the inferior dental nerve is exposed by the invasion of necrosis, the patient has in my experience become subject to severe facial neuralgia which could only be explained by the fact that in the process of filling up the cavity with the deposit of new bony tissue, which must form immediately upon the nerve—the natural wall having been destroyed—the condensation of this tissue presses upon the nerve and causes neuralgia. This has been the accepted diagnosis of a number of such cases.

The medical profession has abandoned the care of the mouth and teeth to the dental profession, and shows us the courtesy of consultation in all cases within the limit of that domain. No one part of the body can be considered independent of the other, and they hold us responsible for keeping the mouth in a healthy condition, this being our specialty.

No mouth can be healthy while there is anywhere within the confines a tooth causing constant irritation and exudation of pus, either through a fistula or about the margins of the gums, caused either by pyorrhea or by a root denuded of its membrane, and it behooves us to give to this condition as much consideration as to arresting the causes of decay.

Third molars are perhaps the source of more trouble in extraction than any other teeth in the mouth. For some reason they are subject to early decay, which sometimes begins with the first evidence of eruption. If the other teeth are intact and in line there is seldom room in either jaw for them to grow in such position as to be of use in mastication, and the difficulty in keeping them clean adds to their liability to decay or to attack from pyorrhea. In the process of eruption they are forced out of position owing to lack of room and to pressure, so that in the upper jaw they turn toward the cheek or backward, causing

inflammation of the tissue of the throat, so that extraction is imperative, and in these cases it can be accomplished with little or no injury, as the tuberosity offers little resistance; but in the lower jaw these teeth grow in the solid bone at the angle where there is no alveolar process, and under the influence of their position present themselves in all sorts of conditions, from coming up straight to lying laterally along the jaw with the crown pointing directly against the posterior surface of the second molar, which renders their extraction difficult in any event, varying in difficulty in proportion to the extent of their inversion, diversion, or curvature of the roots, and adding greatly to the complications. The lower third molar is locked in its position by the second molar in front, by hard solid bone next to the cheek, and back and above by the bone forming the curvature of the ramus, the only pliable surface in its surroundings being the lingual plate, which is near the base of the tongue. In many cases this inner plate may be distended sufficiently to permit the operator to work the crown from under the second molar toward the tongue and successfully remove it, but the strain will cause inflammation of such serious character as to cause interruption of the patient's occupation for a few days during the after-treatment. Where the injury which this operation would produce would appear too great the writer has recommended the removal of the second molar, allowing the third molar to remain. It is the easiest way out of the dilemma for the patient, but of course it is personal comfort gained at a sacrifice.

There is no part of the human body which will tolerate the same amount of abuse and violence as the mouth, or that will respond as readily to proper treatment by recuperation and repair. Nevertheless it is imperative that all operations connected with extraction shall be done with the view of reducing traumatism to a minimum, and it is with this object in view that every means shall be utilized in consideration of the possible suffering on the part of the patient.

Where the tooth is much decayed it is better to cut the crown below the margin of the bone, destroy the pulp, and allow the root to remain for a future effort after it has come to the surface, which may be expected in two or three months or longer, when it can be easily removed. Should there be no decay it will be found advantageous to destroy the pulp; then with a drill make several perforations in the crown to a depth equal to the bone margin, so that it can be cut away and treated again, as in the case of decay; but should either of these operations prove feasible, there is the one alternative left of putting the patient under ether and with a bur cutting away the bone upon all sides until the tooth is sufficiently exposed to be removed. This operation, however, need seldom be resorted to.

After extraction has been decided upon, consideration must be given to the best way in which it shall be done, for it must be remembered that the extraction of a tooth is the most painful operation in surgery for the time required. In the opinion of the writer, with the means at hand for the alleviation of the attendant pain it is foolish for anyone to submit to it without anesthesia, and in the case of children it is little short of crime.

It would seem providential for suffering humanity that almost co-ordinately with the establishing of dentistry upon a professional basis came the means of rendering this operation a painless one, by the accidental discovery of anesthesia as produced by nitrous oxid, through the keen insight of Horace Wells in 1844. The limited knowledge of its properties and the narrow scope within which it could be applied, and the later discovery of the anesthetic properties of ether in 1846, caused it to fall into disfavor, and it was allowed to remain dormant until 1863, when Dr. Colton started the specialty of extracting teeth by its use, since which time history has demonstrated it to be the ideal anesthetic for all our purposes—the safest and the most desirable. Its use has become universal throughout the world, and considering that it has

been administered by practitioners of all grades of experience to hundreds of thousands of persons with a record of only eleven or twelve fatalities, the percentage of deaths from its use appears so infinitesimal that almost absolute safety may be claimed. Its disadvantages are the rapid production of anesthesia and its short duration. This renders it objectionable for general use, and as the public demands that our operations shall be painless, never-ceasing efforts have been made toward finding some method to meet the requirements.

The discovery of cocain and its apparent possibilities has led to an infinite variety of preparations, some of them empirically composed, promising perfection as an obtundent in tooth-extraction. Cocain has found ready acceptance by some practitioners, but the effects, resulting in great suffering, sloughing, and necrosis following its injection in the gum, have been in some cases of such a serious nature that its use has very justly been condemned by many. The ill-effects of cocain injection have to some extent been called to the attention of all dentists, but the number of cases coming under the notice of anyone making a specialty of extracting is appalling. The writer has no hesitation in saying that there has never been anything introduced in and practiced by our profession which can be compared with cocain in creating suffering for and working havoc upon the innocent public. It is not the object of this article to condemn any special preparation, but to make a fair statement of facts as they are daily presented in practice, and to express the opinion that the system of injecting cocain or any drug which produces like results for tooth extraction is wrong. It would be extremely valuable if the experiences of those in the profession could be collated and if a report of the cases that have occurred in their practice were compiled so that reliable statistics might be formulated. Dr. G. C. Robb of Altoona, Pa., who has had abundant opportunities to witness numerous cases of the evil effects of cocain poisoning, writes me as follows:

Mr. G. was brought to me by his family physician. High temperature; pulse very much depressed; great pain and soreness in the lower right jaw from first bicuspid backward. He had been sick about two weeks. The physician had applied heat, tonics, and had stimulated his heart, which was in very bad condition. A saline purge was administered at first and the authorities were followed. The patient recovered in ten days, but was unable to go to work for three weeks.

Mr. V. was in bed with much the same symptoms except for having considerable swelling. The usual treatment was applied. Recovery took place in about two weeks.

Mr. R. presented the same condition in the lower right second molar. He was treated similarly, with the exception that potassium iodid in moderate doses was given.

Mrs. H. There were no bad local after-effects in this case, but since the injection had been made, the patient said, her heartbeat seemed to stop and she could not get her breath. The dentist applied whisky, coffee, and cold cloths, but frequently she had returns of this condition even in her sleep. She was put on strychnin, with careful diet, and was warned against worry and exercise.

I could go on citing numerous cases in which besides sloughing there were no other symptoms, but these cases are too numerous to mention.

In the forenamed cases the bone simply sequestered, and I picked it out in pieces.

According to reliable hearsay we have had three deaths in three years, but I think there have been more, including several cases of partial paralysis. One lady became blind in one eye and partially so in the other. The cases of almost total collapse which physicians report are innumerable.

Dr. James Truman, professor of dental pathology, therapeutics, and materia medica at the University of Pennsylvania, upon request has written me an excellent exposition of the evil effects of cocain from a scientific viewpoint. Want of space prevents its incorporation here in full, but the salient points bearing upon the use of cocain in extraction are as follows:

It is now twenty-five years since this agent was introduced as an analgesic, and in that time a vast amount of knowledge has been collated that should have had its effects in diminishing at least the serious toxic results familiar to all intelligent observers.

There has been a general disposition to ascribe the unpleasant sequelæ, the result of hypodermic injections of cocain, to imperfect sterilization of the needle. That this may be in part the cause is more than probable, but that it explains the necrosis of the alveolar process and the severe post-operative pains upon extraction of teeth cannot be accepted. Cocain paralyzes all parts, that is, it acts directly on the sensory nerves controlling the circulation, in any given locality, and produces at first an ischemic or local anemic condition as the result of paralyzation of the nerves of sensation. The subsequent results will therefore depend on the strength of the solution and the length of time during which the analgesic has been allowed to act. If the amount injected is small and of low percentage, it will in all probability do nothing more than deprive the part of all sensation, but in doing this it may leave as a resultant a hyperemic condition productive of more or less severe pain for days after extraction of the teeth. If on the other hand the hypodermic dose has been large, the death of the relative parts is almost sure to follow and extensive areas of necrotic tissue will result. This has been sought to be explained by various theories, but it is needless to extend the inquiry into supposed regions, for the fact is too well established that all agents that produce paralyzation of nerves produce the same results. The large experience with refrigerants in extracting in the past should have taught this lesson, but it seems to require more than the "line upon line and precept upon precept" to quicken the understanding of the average practitioner.

In view of the foregoing, the writer is fully assured that the use of cocain in hypodermic injection, even in reduced percentages, for the purpose of extraction of teeth, is a very uncertain procedure and liable to produce immediate destruction of contiguous parts, such as gangrene of the gingival and necrosis of the alveolar process. While it is true that this is not universal, and the advocates of this process may be able to point to hundreds of cases without such deleterious results, there remains a more or less severe irritation as a resultant, and the pain may continue for days. It seems impossible that this can be avoided by any after-treatment, as it is the direct result of the drug used.

The toxic and paralyzing effects of cocain hydrochlorid are generally well understood, but whether these deleterious after-effects have made any deep impression upon the dental mind is very doubtful. So much is this the case, and so serious have been the lesions

produced by it, that it is time a warning note had been sounded.

Dr. Truman then makes quotations from Torald Sollmann, M.D., Geo. F. Butler, Ph.G., M.D., J. V. Shoemaker, LL.D., M.D., A. A. Stevens, A.M., M.D., and H. C. Wood, M.D., and continues:

These extracts from different authors might be much further extended, but sufficient evidence has been given to show that the action of cocain is directly to produce the serious lesions adverted to, which have been so pronounced in the practice of some who claim to "extract teeth without pain."

He then draws the following conclusions:

First: Cocain immediately paralyzes all nerves and acts directly on the local circulation.

Second: The paralyzation of the nerves and the vaso-constriction results in temporary and possibly permanent cessation of nutrition to the local parts.

Third: This paralyzation may end in gangrene (sloughing) of the gingivæ and necrosis of the adjacent alveolus; and finally,

Fourth: The possible pathological sequelæ connected with its use render it unfit for adoption as an analgesic in dental extractions.

Dr. Jno. V. Shoemaker, professor of anesthesia and materia medica at the Medico-Chirurgical College, in a conversation related instances of the deleterious effects of cocain within his personal knowledge, and referred to his treatment of the subject in his work upon "Materia Medica and Therapeutics." In that article he does not refer to its application in dental operations, but, after describing its use upon the eye and other mucous surfaces, warns the profession against the dangers accompanying its application, particularly upon the nose, throat, and urethra. Speaking more especially upon these manifestations systemically, he further writes to the author:

These deleterious effects will follow in every specialty, including the use of this alkaloid upon the mucous membrane of the buccal cavity or by way of injections along its course. The same constitutional effect follows its use in the majority of cases that I

have noted in the text-book that you have referred to. It is such a potent alkaloid that it will very often destroy life in all operations, whether dental or otherwise, by paralysis of the heart, spinal centers, or the centers in the medulla. I have, in fact, known several cases in which its use in dental operations and by surgeons has been followed by paralysis and death so quickly that no antidote could be administered. The application of cocain is dangerous, whether used in dental or in other operations, for the reasons that I have given above.

It would be superfluous for the writer to relate details of the individual cases that have come to his personal notice. Their number is legion, and they all present like conditions, varied only in degree—intense pain, severe inflammation, sloughing, and necrosis, running from ten days to a month or longer.

It is the experience of the extracting specialist to have many cases recommended to him in which teeth have been broken in an unsuccessful attempt at extraction. The patient being full of courage, belittling the suggestion of taking an anesthetic for such a simple operation as the extraction of a tooth, says, "Go ahead!"—but should the effect result in breaking the tooth he is very willing to give consideration to the taking of an anesthetic, for there is nothing so detrimental to the courage and heroism of a patient, no matter how brave he may be, as the effort to extract the roots of a broken tooth. These cases are more severe than those of ordinary extraction, but we may expect relief from pain, even in regular abscess, in an hour or two, and the healing process will be established in a couple of days.

With the advent of cocain injection, such cases came with increasing frequency, followed by the inevitable sequence—extreme inflammation, severe pain, sloughing, and necrosis. The situation became puzzling and embarrassing. Extraction of the roots brought no relief from the pain; on the contrary, the inflammation was augmented by the effects of the efforts to remove them, and no amount of palliative treatment would bring about responsive results until the inflammation reached its height in the

formation of pus and invariably in the exfoliation of a sequestrum. Some of the unfortunate victims would fall into the hands of physicians, who unintentionally in endeavoring to explain the cause would let drop a remark in the presence of the patient that "The jaw-bone must have been broken," or that it was a case of "infection," which conveyed to the minds of some of the patients dire and

Of course these are extreme cases, but it is no exaggeration to say that hundreds of cases have presented themselves where the extraction was complete, but the patients, suffering great pain, suspected fracture or other injury. Two recent cases of this nature may be cited: First, Injection had been made for the extraction of the upper left molar. Ten days afterward the patient called, and it was

FIG. 2.



dreadful things, with the result that in several instances threats were made of suits for malpractice and damages, based upon the patient's interpretation of the physician's diagnosis; suits were actually started in a number of cases. It did not take long to realize that there must be a cause for all this distress, and this cause was found in every case to be the injection.

As extraction could give no relief, but added to the difficulty, we refused to operate until the inflammation had run its course, preferring to let some other practitioner bear the ignominy of the results, which are shown in the illustration, Fig. 2.

found that the gum had sloughed, extending over the surface of the first and second molars to the second bicuspid; the alveolar plate was perfectly bare, with evidence of further extension. It was recommended to the patient to go to an oral hospital, and when last heard of three weeks later he showed every indication of blood poisoning. The second case was one in which all the upper teeth had been extracted two weeks before. It was as perfect an operation as could be desired, as far as the extraction was concerned. No laceration of the gum or fracture of the process could be discerned. The gum tissue was loose from the alveolus all the way around

from one third molar to the other, and every socket was as completely bare of granulation or regenerative structure as empty honeycomb cells, and was exuding offensive serumal matter.

Aside from the resultant injury, the injection of cocain is not efficient and does not render the operation a painless one in all cases. The sensitiveness to pain of the peridental membrane under the conditions of inflammation, incipient or regular abscess, is second only to that of an inflamed pulp, and there is no local anesthetic known that when injected on the mucous membrane outside the alveolar plates will penetrate the bone and will so obtund the membrane lining the socket that its rupture in the act of extraction will not produce severe pain; therefore to claim that teeth under such conditions can be extracted without pain by the application of local anesthesia is to claim that which is not true.

In looking for an explanation for these deleterious results we do not have far to seek.

Pathologically the effect produced by local anesthesia is identical with refrigeration, and refrigeration has been abandoned years ago as being unfit for the purposes for which it was then recommended. It paralyzes the peripherals, and deprives the area so affected of its natural circulation of blood for a length of time equal to that required for the paralysis to wear away. Hand-in-hand with the re-establishment of the circulation in these parts go congestion and inflammation, to which the injury to the mucous membrane caused by the puncture of the needle very materially adds. If in addition we have an inflamed or abscessed peridental membrane within the socket, or if the process is distended or otherwise injured by enlarged, curved, or distorted roots in the efforts of extraction, the alveolus has small chance of recovery intact. Extreme inflammation, severe pain, sloughing and necrosis become inevitable. A sequestrum does not invariably occur, except in cases of alveolar abscess, but a sluggish state of progressive necrosis follows, with gradual breaking down of the alveolus, involving the

surfaces of one or more of the adjoining teeth, and when this has reached its limitations the parts affected are equally slow in repair. It is admitted by advocates of this process of extraction that in cases of alveolar abscess accompanied with swollen tissue the injection of cocain is not applicable, but it is wholly inadmissible in all cases where by too long retention of a diseased root the surrounding bone structure has become involved in the disease.

No one will say that cocain is not a desirable addition to our dental pharmacopeia. It has its uses. In cases of simple extraction, of loose teeth, and in such cases as would seem to render a general anesthetic unnecessary, its application works admirably; but why should an injection be made in such cases? Specialists in nose and throat affections do not inject, but apply the drug to the surface, which is all that is required in these cases. It will benumb the gingival border about the neck of the tooth so that the forceps can be placed in position without pain, and under such conditions the tooth can be taken out without discomfort to the patient and without serious after-effects.

It has been suggested that other drugs be combined with cocain to overcome its deleterious effects, the one most recently employed being adrenalin, which is said to confine the anesthetizing influence to a limited area; but I offer for consideration the fact that any drug in order to act in that way must do so by coagulating the albumin in the blood in the small vessels which supply the circulating fluid; this coagulation will prevent the return to normal conditions within a reasonable time, and the longer this paralyzed condition is continued the greater is the danger of inflammation as an aftermath.

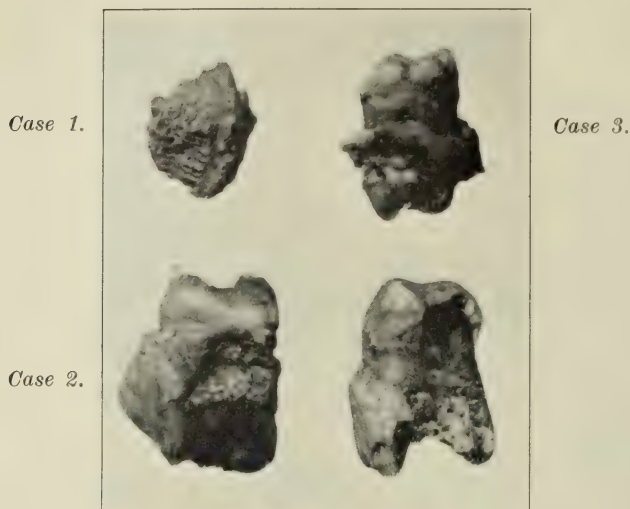
To illustrate more emphatically the deleterious effects of these injections the following cases (see specimens, Fig. 3) may be cited:

Case 1. An injection had been made and the tooth was broken off in the attempt at extraction. The inflammation was such that operation was declined at that time. Within

a week the line forming the boundary of the sequestrum was complete, and the whole mass was removed. If we had operated when the case was first seen no relief would have been given, but the pain would have been aug-

ment to permit the extraction. A week later the situation was similar to case 2, and extraction brought with the tooth the process surrounding it, including the septum between it and the second molar.

FIG. 3.



mented, and the sequestrum would have formed just the same.

Case 2. An upper third molar had been injected, and the effort to extract had failed. Five days later the inside of the mouth was highly inflamed and the cheek was very much swollen. The tooth rested in a bed of sup-puration, and its extraction brought with it the tuberosity.

Case 3. The patient presented a perfectly sound and healthy upper third molar with no opposing tooth below, but extraction was advised in order to give better opportunity for filling a cavity in the posterior surface of the second molar. Injection was made, and then the patient's courage failed him. He refused

In cases 1 and 2 some of the results might have been laid to the traumatic effects of the efforts at extraction, but not so in case 3, as the tooth had not been touched. In each case the line of demarkation of the sequestrum followed almost exactly the area limit of the local anesthetization.

In view of the experience here recorded, it would appear that the injection of cocain into the tissues of the oral cavity for the extraction of teeth is wrong, and should be denied a place in dental practice.

THE RELATION OF DENTAL LESIONS TO INSOMNIA AND NERVE STRAIN.

By J. W. VAN DOORN, D.D.S., Cleveland, Ohio.

(Read before the Cleveland Dental Society, January 4, 1909.)

IN this paper it is not the writer's intention to take up the subject from the standpoint of the medical man. Anyone wishing to do that I would refer to a book entitled "Insomnia and Nerve Strain," by Dr. Henry S. Upson of Cleveland, published by G. P. Putnam's Sons of New York, which most thoroughly covers the ground from the standpoint of the neurologist.

A considerable number of interesting and important conditions, peculiar to the teeth and eminently proper for the dentist to consider, develop as incidental features to the treatment of the neuroses and psychoses.

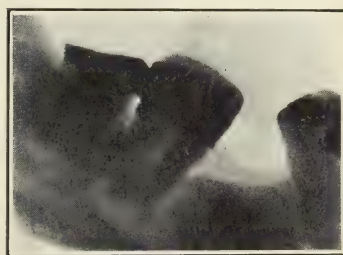
It has been my good fortune during the past fifteen months to have been intimately connected with a number of cases in which the teeth were found to be the cause of nervous disorders, and in which the proper treatment of the teeth has been productive of a return to normal general health. I cannot elucidate my subject in a better way than by citing actual cases, and making some further general statements in connection with each case.

The first case of this kind brought to my attention was that of a man of about thirty-five years of age, who for over a year had been a persistent sufferer from insomnia. His appearance was pitiable. He remarked that he had been sent to me, but that he did not know why, as there was nothing the matter with his teeth. In fact he specifically stated that he had had them overhauled less than two months previously, and that they had been pronounced by his dentist to be in good condition. He also remarked that

he had not had a whole night's sleep for over a year, except when it had been secured by the use of opiates, and that having exhausted nearly all of them by repeated use, he was at the verge of despair unless he could very soon find relief.

An external examination of the teeth revealed some slight lesions, not serious

FIG. 1.



This skiagraph is not of the insomnia case cited, but is typical nevertheless. Despite the loss of tissue around the molars, no local symptoms had been observed.

enough, in my judgment, to have wrecked his nerves to the extent of causing chronic insomnia.

He possessed skiagraphs of all his teeth, which Dr. Upson had requested him to secure. Scrutiny of these revealed six teeth with areas of absorption surrounding the apices. (Fig. 1.) For want of a better term, this condition has been denominated "cold abscess."

What do we mean by a cold abscess? We mean a collection of pus surrounded by tissue in a state of repair, in which neither the reparative nor the destructive

process is making any headway. In case the destructive process is gaining on the reparative one, more tissue is being constantly involved, and we have an acute abscess with all of the local symptoms, including heat, swelling, and pain, which we can relieve by evacuation; or we have the formation of a natural opening or fistula, resulting in a chronic but comparatively painless abscess.

In case the reparative process is gaining on the destructive one, the abscess disappears, with or without local symptoms.

The skiagraph reveals very clearly and unmistakably the absorption of tissue in connection with these abscesses. This statement must not be misunderstood; the skiagraph does not reveal these abscesses unmistakably, it simply reveals the loss of tissue in connection with such abscesses.

The peculiarity of the whole condition from the dentist's standpoint is this: The patient has or has had absolutely no pain in the teeth themselves, nor in the region of the teeth; they are not sore or tender under percussion, nor responsive either to heat or cold.

Sometimes, most times as a matter of fact, teeth so affected are those from which the pulps have been removed and in which the root-canals have been filled, sometimes entirely, sometimes partially. Sometimes the death of the pulp in these teeth has occurred after they had been filled. In this latter case, we all know the ordinary result: Local inflammation, swelling, tenderness under percussion or under the impact of mastication; the tooth is elevated in the socket and painful. These symptoms are only to be abated by opening up the tooth to let out the gas or pus, by lancing the swollen gum, or by both procedures, or in some cases by the extraction of the tooth.

How then, shall we explain those abscesses in which all of these symptoms are absolutely wanting?

In this way, it seems to me: The amount of pus produced in any given time is so small or, to put it in another way, the rate of its production is so moderate—and this is so, of course,

simply by reason of the small amount of tissue actually broken down—that the lymphatics are able to take care of it. Unless the lymphatics become overloaded with the putrefactive alkaloids, the patient experiences no bad effects; but if they do, the blood becomes poisoned, the poisoned blood irritates the nerves, and the patient suffers from some form of neurosis or psychosis. We have then insomnia, melancholia, chronic or periodical neuralgia, dementia, or some one of the long train of nervous debilities.

To revert to the case of the insomnia patient, we treated the affected teeth for several weeks, having opened through to the abscesses with Gates-Glidden drills and pulp-canal cleansers, so that we were positive of carrying the medicines to the seat of the trouble. Before the treatment was completed the patient was able to sleep fairly well; at the time of completion of the treatment his sleep was normal. This patient was dismissed in December 1907. I have seen him numerous times since then, and he has had absolutely no return of his insomnia.

The second case which I wish to cite is one of the most remarkable which I have ever encountered. A lady of about forty years of age was referred to me as the victim of periodical paroxysms of neuralgia. These attacks had existed for fifteen years, during the last three years becoming more frequent and more severe.

A superficial examination of her teeth revealed nothing amiss. A lower right first molar and an upper left second molar, which contained very large fillings, excited my apprehensions to such an extent that I asked her to go to Dr. Lodge and have them skiagraphed, which she did. A considerable area of absorption was revealed about all of the roots of the upper molar (Fig. 2), and a like area of absorption about the anterior root of the lower molar. No attempt had been made to fill the canals of the upper molar, and I therefore assume that the pulp had died subsequently to the filling of the tooth, which had been done two years previously. This tooth was of course out of the question as a possible cause for

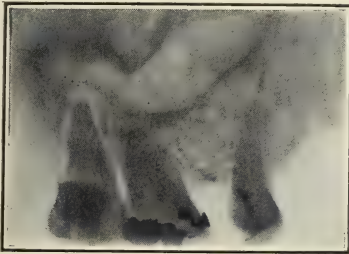
the neuralgia of fifteen years' standing, although it might well have contributed, and probably did contribute to the increased frequency and severity of the attacks.

The skiagraph of the lower molar (Fig. 3) revealed the posterior canal to be filled to its extremity, but without the semblance of a filling in the anterior canal. I explained to the patient the necessity for opening up both teeth. She strongly objected to my opening the lower molar on the ground that it had been filled for thirty years, had never given her the

myself I am free to say that I am in considerable doubt about a good many of my pulp-canal cases of former years, in which I have taken absence of pain in the tooth as an evidence that the tooth was all right.

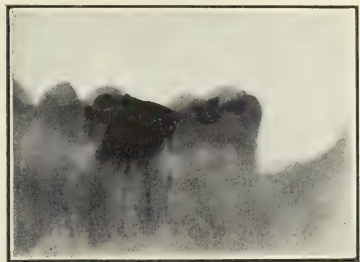
The third and last case which I wish to cite is a case of melancholia which was also referred to me. External examination revealed nothing serious. Skiagraphs taken by Dr. Lodge revealed a number of teeth with areas of absorption about their apices. Some of these teeth were taken out, others were treated for

FIG. 2.



Upper second molar on the left.

FIG. 3.



Lower first molar on the right.

slightest trouble, and was not troubling her at the present time; moreover, all her neuralgia was on the other side of her body. But we finally secured her consent to have it opened. The moment we opened the pulp-chamber the patient became convinced that thirty years of comfort in a tooth is an utterly unreliable evidence as to its perfect condition. I have been in practice for eighteen years, but never in all my experience have I encountered anything so unspeakably vile as the odor from that tooth.

We treated both of these teeth three times a week for seven weeks before we were able to seal them. We dismissed this patient in January 1908. I did not see her again until the first week of November, when she called for examination. She reported that she had not had the slightest return of neuralgia since leaving my office last January.

I do not know your opinion, but as for

several weeks. Before we had finished the lady showed marked improvement, and within a short time after treatment was completed was in normal condition. This young lady had as little cause for depression aside from the dental lesions—of the existence of which she could have not the slightest idea—as one could possibly imagine. She had wealth, friends, a beautiful home, and the education and culture that should go with such a happy environment. Think what it meant for her to be the victim of an unaccountable melancholia. She knew as well as you or I that there was apparently no reason for it. That simply aggravated it.

We finished her case early in the spring of 1908. She has had no recurrence of her melancholia up to this time.

There is one class of cases revealed by the skiagraph of which I wish to speak, although I have never had anything more to do with them than simply to advise. It is perhaps the most important of all,

certainly the most obscure to ordinary methods of examination, and fraught with the most serious results. This is the case of the impacted tooth.

Usually it is a third molar which is impacted. Sometimes an ordinary examination of the mouth will reveal it, but the worst cases are those whose unsuspected existence can only be revealed by the skiagraph. These worst cases are by this means shown to be deeply embedded in the maxilla. Fortunate indeed are the dentists and the people of this locality in possessing two men like Dr. Teter and Dr. Ziegler, who can remove such impacted teeth. This is a surgical operation, which in my humble opinion the average dentist should not attempt.

Occasionally it is a fourth or supernumerary molar which is revealed by the skiagraph; not infrequently it is some other tooth which has not erupted at the proper time and in the proper place, and is found usually lying horizontally in the maxilla in close proximity to the roots of the other teeth. When teeth are missing in the dental arch and you are told that they never erupted, it would be ordinary caution to have the jaws skiagraphed, in order to ascertain whether or not they may be found at some point in the maxilla, where they may give rise to trouble.

It seems to me that these teeth should invariably come out; fragments of teeth, also, more particularly broken-off roots, should be extracted at all hazards. These latter if left in the mouth may not cause any local pain or distress, but, in the light of our present knowledge, who shall say how far they may be the cause of many and serious systemic nervous disorders?

Pyorrhea assumes a new importance and should be radically dealt with. Better by far to lose a few loose teeth, or all of them if they are all loose, than to run the risk of nervous cachexia.

If any bridge work be essayed, be very careful not to spring a bridge into place. The strain on the pier teeth in such a case is a possible source of irritation sufficient to produce serious results. Moreover it is debatable, at least, how many teeth may be safely carried by two or

three abutments. This is not altogether a mechanical problem, but a therapeutical one as well.

Teeth badly worn by mechanical abrasion or teeth from which the enamel has disappeared by erosion are also to be regarded as possible sources of irritation, and treated accordingly.

To revert once more to pulp-canal cases, it seems to me that our method of caring for such cases must be in some degree defective if we cannot longer say with safety that, because a tooth never gives pain, it must therefore be in good condition.

One of the commonest revelations which the skiagraph gives is that a tooth is manifestly in bad condition, and yet is causing no pain. Canals beautifully filled from the mechanical standpoint have proved to be utter failures from the therapeutical aspect. Canals comparatively large, straight, and accessible, perfectly filled so far as the skiagraphs indicate, nevertheless in some way become infected, so that at times we have inflammation proceeding to the stage of absorption, and that, too, without the patient experiencing anything in the way of local symptoms. If this be so with cases which are handled well from the mechanical point of view, what must be the conditions possible in those cases which are handled ill!

The only source of comfort which I can find in that situation is the fact that even the skiagraph does not always reveal areas of absorption about every tooth which has been treated in this ill manner.

There is one other condition of the teeth which might be a cause of systemic trouble, and that is the presence of so-called pulp-stones. It is true that more often these are indicated by local pain, but they might easily cause pain of the protopathic rather than the epicritic sort. The skiagraph will be found an admirable help in determining these cases.

In conclusion, I wish to say that in the past fifteen months I have handled perhaps over a hundred cases in which the skiagraph has revealed defective conditions of the teeth, which otherwise would not have been noticed. In the

great majority of them insomnia, melancholia, and chronic neuralgia have been the systemic manifestations. Besides these, there have been cases of neurasthenia, partial paralysis, epilepsy, and insanity. There have also been two cases in which the eye has been apparently affected, with decided impairment of vision.

I would not wish to be understood as making any such statement as that in all such cases the cause is to be found in defective conditions of the mouth and teeth, but it is a perfectly true statement that in all the cases with which I personally have been concerned, the teeth have been shown by the skiagraph to be in bad condition, and that, too, without the patient being in the least aware of that fact. It is also a perfectly true statement that in very many of these cases the restoration of the teeth to a proper condition, or the extraction of diseased teeth has been followed by a complete return to normal general health.

Discussion.

DR. E. BALLARD LODGE, Cleveland. Just as the science of astronomy and our knowledge of distant suns and nebulae has been increased by such modern means of observation as the Lick and Yerkes telescopes, together with stellar photography, so the field of dentistry has been enlarged by recent developments in pathology and diagnosis aided by the microscope, the test tube and the application of nature's marvelous agencies, prominent of which is that form of radiant energy known as Roentgen rays.

The most noteworthy point which the essayist has made, aside from the fact that the serious disturbances spoken of result from diseased teeth, is the fact that they are so frequently unattended by the symptom of pain in the tooth or teeth involved that there is no clue by which the cause of the trouble may be ascertained. The time has come when we must be more concerned with the gravity of dental conditions, and first of all with the importance of the status of the pulpless tooth, in which the pulp has been

removed or destroyed, or in which the pulp has become necrotic or putrescent, or has in some degree undergone degeneracy to the utter death of the organ. The time has come when we must be alert to take into account the possible sequelæ that such conditions may involve.

I am reminded of a case of one of my patients who had had an upper right lateral root-canal filled thirty-three years before. The tooth had remained quiescent all that time only to develop an alveolar abscess, which the X ray proved to be caused by a fault in the filling at the apical third.

We as dentists may well be proud of the brilliant accomplishments of our beloved profession, but two extremes need to be avoided, viz, too great readiness to extract teeth and too much conservatism. The essayist seems to take the right stand in advocating the extraction of teeth that are of doubtful value.

If one is doubtful as to the advisability of extraction, he had better be on the side of conservatism. In my own practice I think the number of teeth extracted averages less than two per mouth. The subject of the essayist's paper was "Relation of Dental Lesions to Insomnia and Nerve Strain." Is it not possible that in the first case of insomnia cited the patient received at the hands of the neurologist and of the dentist so many suggestions about the sleep that was about to envelop his shattered nerves that, as a matter of fact, he was actually receiving treatment by the psycho-therapy of Paul Du Bois. I wish we could know just how much of that element we could leave out in our naming the remedy which effected the cure.

My work in X-ray examinations of the teeth has brought me in contact with a great number of patients suffering from neuralgia, insomnia, etc.; but unfortunately I have not followed up the insomnia cases to acquaint myself with the result. To this statement, however, I may make one exception: A lady referred to me had been greatly distressed with insomnia, and after X-ray examination was found to have impacted upper third molars.

These were extracted, and when I saw her some months later she was greatly pleased with the result, as she was very well again.

The most notable case of nervous disorder with which I have had to do—outside of examinations made in various state hospitals for the insane, the results of which I am as yet unable to report—was that of a young lady whose case I cited in the *Dental Summary* for March

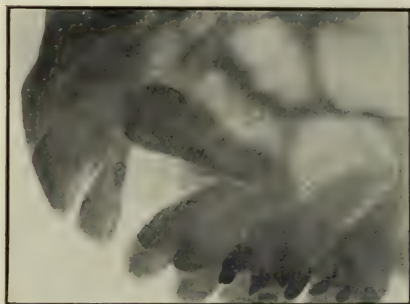
had suffered from neuralgia for six or eight years and for six months had not been able to work, so great was his distress; he was melancholy, greatly depressed, and could not think clearly. He became emaciated and his friends had grave fears of his mind giving way. There were pains in the right superior maxillary region, the temporal frontal and post-auricular regions of the same side, also pains in the back and limbs.

FIG. 4.



Impacted upper left third molar, the cause of melancholia in the case cited.

FIG. 5.



Skiagraph showing a misdirected canine, the cause of neuralgia in the case cited.

1908, in an article entitled "Serious Nervous Disturbances Due to Teeth." The patient, a young woman, had been afflicted for more than a year with profound melancholia; there was terrible depression, delusions of having committed many deadly sins, and tendency toward suicide. Medical treatment had been of no avail.

Her teeth were on the whole in better condition than those of the average patient. Dr. Stephan was instrumental in sending her to me for an X-ray examination, which showed an upper left third molar to be violently impacted against the second molar. (Fig. 4.) Extraction was followed in a few weeks by a cure. This case was notable by the absence of pain.

The most interesting case of neuralgia was brought to my notice only a few weeks ago. The patient, a draftsman, thirty-seven years of age, was sent to me by Dr. Terry for X-ray examination. He

The absence of the upper right canine attracted my notice, and on questioning the patient I was told that it had been extracted when he was a boy. This must, however, have been a deciduous tooth, as the skiagraph revealed the presence of a permanent canine in a very awkward position. (Fig. 5.) It was found to be nearly horizontally placed, the crown being directed against the apex of the lateral root toward the lingual aspect. The tooth was removed by Dr. Teter, with almost immediate cessation of the neuralgia.

Dr. H. C. KENYON, Cleveland. The subject under discussion, while it is not new, has been given a new significance for the dental and medical professions by the researches and observation of Upson, Van Doorn, Lodge, and others who have been observing especially oral conditions as a factor in the etiology of neuroses and psychoses.

My experience with a large number of

such cases leads me to consider the following as frequent causes of mental and nervous maladies:

Any condition resulting in continuous or periodical irritation accompanied by chronic or intermittent inflammation may cause such nervous disorders. Pus formation may or may not be present, but in a large number of cases it is, and in my opinion is the real factor to be considered in most cases of obscure neuralgia and of insomnia, and probably also in melancholia. By far the most of these cases arise from the failure of the treatment for some form of pulp-canal or periapical ailment. Next, I would cite irritation of the peridental membrane in the gingival region, caused by rough fillings overhanging gingival cavity margins, crown bands, calcareous deposits, and pyorrhea. Malocclusion, pulp-stones, and impaction of teeth are other causes to be considered. It will be noted that this list of causes coincides practically with that developed by the essayist in his description of cases.

The direct connection of these local conditions with any of the nervous disorders from which the patient may be suffering at the same time is usually somewhat obscure, and difficult to establish except by eliminating the dental condition and judging from results, but fortunately for both the dental surgeon and the patient, most of these abnormal dental conditions demand immediate eradication independent of any results produced by them outside of the oral region; so we are usually quite safe in insisting upon radical operations, if necessary, for their removal or cure. But in the case of impacted teeth, my personal experience and observations have been so limited that I am scarcely competent to advise; it would, however, seem to me that the connection between the impacted tooth and the nervous disorder should be well established before the operation is advised, unless there is some local reason for removing the tooth. Doubtless many of these teeth are unsuspected offenders for long periods; still, I think, many of them never do any harm and might better be left unmolested.

It should be noted that occasionally relief from the nervous disorder does not immediately follow the cure of the dental malady. This may to some extent be due to the irritation following the operation, but it should be remembered that this dental lesion has caused a diseased condition in some portion of the nervous mechanism, which must be given some time to recuperate. I recall several cases in which complete relief was not accomplished until two or three months had elapsed after the dental operations. In these cases, however, several teeth were involved, which rather aggravated the conditions.

I am convinced that radical treatment is usually in order in these cases. Half-way measures are inadequate, and should not be considered. I agree wholly with Dr. Van Doorn's recommendation of extraction in those cases where the patient is unable to afford the proper and thorough treatment necessary. I would most seriously take issue with the essayist, however, when he recommends extraction because of inability to penetrate the apical foramen to the abscess. In fact, in all cases where resorption of apical tissues has progressed to any appreciable extent, I am very skeptical of any very permanent good resulting from treatment attempted through the pulp-canals alone. All such cases require treatment through the alveolar process also. All of the apical portion of the root that has become denuded of its peridental membrane should be excised, and all the devitalized and diseased tissues contiguous to it should be removed with suitable instruments in the engine. This operation should be performed thoroughly through an opening large enough to afford a view of the field of operation. In the ten anterior teeth, upper and lower, this is not a difficult nor a painful operation to perform, but it should not be undertaken at all unless it is thoroughly executed; then success is almost certain to follow.

Possibly some of us have carried conservatism in extracting teeth to an extreme that is ridiculous, and yet we should never extract a useful tooth until every reasonable effort has been made

to put it into a comfortable and a healthy condition. The condition of comfort is not enough; the tooth must also be healthy, and if this is impossible, remove it even though it be comfortable. We have no right to leave in the mouth such a menace to the patient's general health. Nor do I think the dental surgeon should take his orders from the medical practitioner—be he ever so wise in his own profession—who finds among his patients those suffering from disorders which are caused or aggravated by disease of the dental organs. The medical man may very conscientiously advise the removal of the offending teeth as the shortest and surest method of relief, and he may very likely be excused for not knowing, in individual cases, that there is a better or more conservative way of accomplishing the same end without mutilating the patient. It is the dentist's duty to know this, and he should exercise his knowledge, and accomplish the result in the better way.

While it is possibly not directly to the point in this discussion, still, because it is as important to prevent disease as it is to cure it, it may not be out of order to at least cite some of the reasons for the very frequent existence of these conditions in the periapical tissues following canal treatments. In this connection I would mention direct infection, which is sometimes unavoidable, but more often due to negligence of the operator in his technique, and in the care of his instruments and filling materials. Another source of infection is the circulation, but we have no evidence that infection from this source ever occurs in healthy tissue. There must be a previous condition of inflammation induced by chemical or mechanical irritation to give the germs their required opportunity for attack. This leads me to mention the passing of broaches beyond the apex, the forcing of filling materials through the foramen, the intemperate application of caustic and of penetrating drugs beyond the apical termination of the canal, and the use of gutta-percha temporary stopping as a sealing

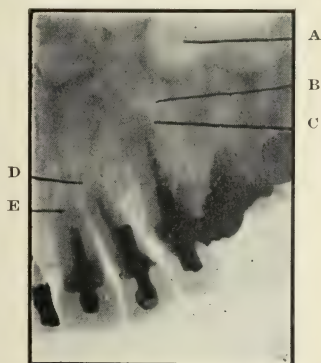
for cavities over infected or medicated root-canals, as being too frequently the cause of these predisposing irritations and inflammations. In this connection also, the incomplete cleansing and filling of small pulp-canals should be mentioned, and the filling of the apices with irritating substances such as cement, or gutta-percha points containing a metal reinforcement, or any medicated filling that contains an irritant, such as Ox-para for instance. Some of the most aggravated cases which I have had to deal with have resulted from this cause. Formaldehyd should form no part of a permanent root-filling material.

In conclusion, I beg to cite the following case, which is only one of a number that I might describe: A man of about forty years of age, with large business interests which at times demand very close application, came to me with the request that I make as thorough an examination as possible, and advise him if I were able to afford him any relief, saying that he had been examined by an oculist and treated by a stomach specialist, and told that neither his eyes nor stomach were guilty. He was suffering from insomnia and irregularly periodical neuralgic headaches of so severe a type as to incapacitate him for business for two or three days at a time. These headaches always started with a deep-seated dull heavy pain in the face at a spot about three-quarters of an inch below the right eye. From this the pain circled around above the eye and rapidly spread through the entire top and back of his head, becoming very intense. These periods lasted from one to three days. This condition had existed with varying intensity and frequency—as nearly as the patient could remember—for from fifteen to twenty years.

Upon examination of the mouth I found the upper right bicuspid crown restored by an amalgam filling equal in size to half the crown, with the pulp vital, but the canals nearly obliterated and the pulp-chamber containing pulp-stones. The canine carried a Logan crown that had been in place for about

seventeen years. The skiagraph (Fig. 6) showed one-quarter of an inch of the apical end of the canal unfilled, and a large area of resorption around the apex of the root. The right lateral also had been restored at about the same time with

FIG. 6.



A, Maxillary sinus. B, Necrosis of maxilla.
C, D, E, Unfilled pulp-canal extremities.

a similar crown, and the skiagraph showed about one-sixteenth of an inch of the apical end of the canal unfilled, and a very small area of resorption about the apex. The central incisor also bore a Logan crown, the skiagraph showing a small portion of the root-canal unfilled, but no definite sign of more than a very slight resorption. The left central canal (not shown in this illustration) was also poorly filled and showed definite but not extensive resorption about the apex. This tooth had its natural crown with a large cavity. There were other defects in the mouth, but with no probable bearing on the nervous disturbance. The patient's

mouth had been treated, by one man, at about the same time, and the coincidence of the time of the existence of the neurosis and the time since the dental operations were completed appeared suspicious to me. The treatment of this case included devitalizing the bicuspid and filling the roots and crown to the best of my ability. I found the two canals much obliterated and the pulp-chamber full of pulp-stones. In the canine the crown was removed and the canal opened, sterilized, and thoroughly plugged with gutta-percha, which protruded through the apex, after which the operation for excision of the apex, etc., was performed as described in the earlier part of this discussion, and a new crown placed on the root. In the right lateral the crown was removed, the canal opened, and the resorption being slight, treatment was installed through the canal; later the canal was thoroughly filled to the apex, and a new crown mounted upon the root. The right central was unmolested, its condition being in our judgment very nearly normal. The left central was treated exactly like the right lateral except that the crown restoration was made with a gold inlay instead of a crown.

This case was completed about six months ago, and the patient has had no recurrence of his trouble except once, shortly after the operation on the canine root. He himself attributed this to the condition of his stomach and to voluntary loss of sleep at a time when his business cares were unusually heavy. I am of the opinion that during all these years his entire trouble was caused by the conditions at the apices of the upper right canine and lateral.

THE HOLLOW-PIN CROWN.

By HARRISON D. BEST, D.D.S., Pittsburg, Pa.

(Read before the meeting of the Seventh and Eighth District Dental Societies of the State of New York, Rochester, N. Y., November 12, 1908.)

CROWNING and bridging are not new subjects. The author, however, would advocate not a mere variation in technique, but a rather radical departure made possible by the use of a new crown—the hollow-pin crown.

The hollow-pin crown has been presented before, but probably very few of those present have seen or heard of it. Moreover the author would present a new satisfactory manufactured pin and a special porcelain crown, which must first be described.

The pin is a tube. The inside diameter of the tube is a little less than B. & S. gage No. 17 at the coronal end and less than gage No. 18 at the apical end. The walls of this tube vary in thickness, being thickest at the points of greatest strain, which are at each side of the medium sized collar. Especially below the collar strength is needed, and here the pin has a diameter of a little more than gage No. 13; from this point it tapers to about gage No. 15, in this way obtaining a pin that has the greatest strength where it is most needed and which at the same time does not demand the sacrifice of too much root-substance. The coronal end of the pin is between gage No. 15 and No. 14, a little larger near the collar.

There are many advantages in a round, tapered pin, but these will not be dwelt upon, except to quote them as stated by Dr. R. L. Simpson in the *DENTAL COSMOS* August 1908 and in the November *Dental Summary*: Ease of shaping canal to fit the pin; minimum cement; maximum strength. Dr. Simpson also points out that pins should not be grooved,

nicked, or notched, as that inevitably weakens them. The hollow pin is very delicately knurled by machine both above and below the collar. Although this knurling only goes to a depth of $1\frac{1}{2}$ to 2 one-thousandths of an inch, still it gives great retaining power. The pin is beveled off obliquely at the coronal end, since the hollow pin, unlike any other, extends entirely through the crown and ends flush or slightly counter-sunk on the lingual or masticating surface. The material in the pin is a very tough, strong, high-fusing and non-corroding composition, which will stand all strain that will be put upon it.

The crown is all porcelain. The porcelain is very high-fusing and very strong. It must be perforated, of course, to allow the pin to extend through it. This perforation is grooved along the labial side, where it does not increase the danger of breakage. This groove increases the retaining power and excludes the possibility of rotation.

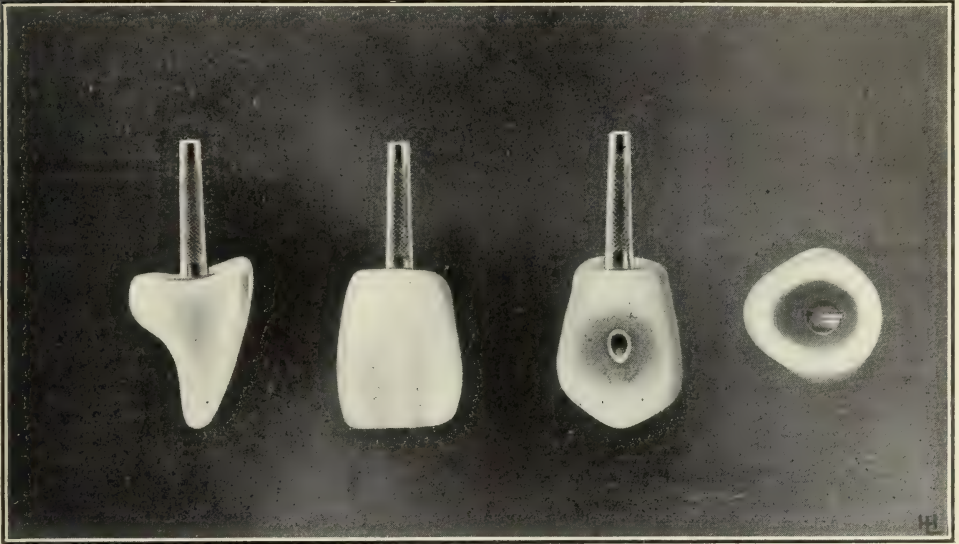
In order that the pin may come out at the proper points on the root-surface and on the labial or masticating surface, this perforation through the crown must take a fixed direction in every mold, but in order to preserve the correct direction of the end of the pin, it is bent at the collar, which of course may need further modification in individual cases.

This description of the detached-pin crown applies very largely to the crown with the baked-in pin, which it is hoped can also be brought to a state of completion soon.

The hollow-pin crown offers many ad-

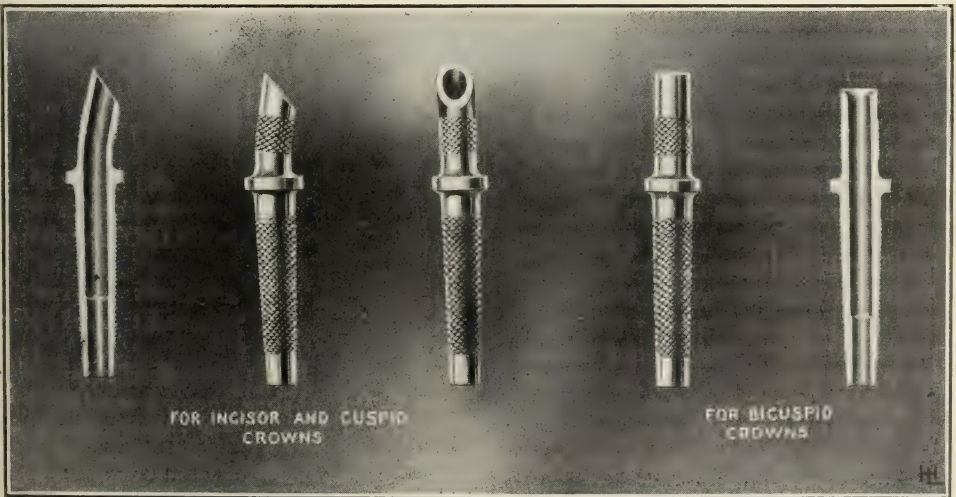
vantages to the user. The very name readily as long as may be necessary—suggests the possibilities of treating dis- a very satisfactory condition to both pa-

FIG. 1.



eased roots. A diseased root may be prepared, the crown immediately set, and patient and dentist. The patient is greatly pleased to be able to get his crown at

FIG. 2.



treatment instituted at once through the tube. Treatment may be continued once, which is very important to those who have to appear in public. The den-

tist finds great satisfaction in the thorough, deliberate, and easy means afforded for treatment, since treatment is as easily carried out with the hollow-pin crown in place as in the root alone.

This brings us to the method of setting the crown, which may be summed up briefly.

As with any crown, the usual precautions are to be observed in regard to a careful selection of the proper size and shape of the mold and consequent avoidance of unnecessary and detrimental grinding, to the careful preparation and shaping of the root, and in drilling the root for the pin the canal need only be enlarged with a rose-head bur or the reamer.

After the crown and the root are well filled and prepared, it is set. In this a variation is necessary. The pin and the root-canal below the pin should be filled with gutta-percha, in order that if treatment should ever become necessary, they may be readily opened up. The coronal end for a short distance should be left open to receive the final filling of the pin at the surface of the crown. Any filling material desired may be used, cement or gold being easily applied with good results. The root-canal below the pin may be filled separately with gutta-percha, or a point may be placed in the pin projecting well beyond its end, and then both pin and point may be carried into the root at the same time. In either case the pin proper is set with cement. The gutta-percha prevents the cement from entering the pin or the root-canal below the pin.

The hollow-pin crown is very easily adapted for bridge work. This is accomplished by means of a special backing, which I have called a cap backing. This consists of a solid pin small enough to enter the hollow pin, with the ordinary backing soldered to it necessarily at an angle. This inner pin prevents any possibility of slipping or working loose, so that a very strong backing is the result. The crowns used as abutments are of course articulated in the mouth, and allowance must be made in doing this for the cap backing. The remaining steps in making the bridge are very similar to those in making an ordinary bridge.

Only some of the advantages of such a bridge may be mentioned. In the first place, it is as easily built as the ordinary type of bridge, yet has the esthetic appearance of porcelain.

In the second place, the bridge may be made removable, so that treatment can be continued. If a root requires treatment at the time of the setting of the bridge, the telescopic pins of the cap backings can be so snugly fitted that no cement at all is needed. The bridge may then be removed as often as is necessary, with no waste of time. In doubtful cases, or whenever desired, gutta-percha may be used to attach the cap backings, making a bridge which may be removed with comparative ease. Such possibilities of treatment afford great facility in saving roots and in individualizing bridges.

Lastly, the repair of a bridge is rendered more easy and more rapid, with less destruction of any of its parts.

A PLEA FOR RATIONALISM IN MODERN METHODS OF PRACTICE.

By C. N. JOHNSON, M.A., L.D.S., D.D.S., Chicago, Ill.

(Read before the New York Odontological Society, at its anniversary meeting, January 19, 1909.)

IN the rapid evolution of ideas in our profession it behooves us to pause occasionally and consider soberly the real status of some of the new things, and see if in our enthusiasm for the innovations we are not overlooking some of the virtues of older and longer-tried methods. Enthusiasm is a wondrous factor in our professional development. It is the lever which lifts us out of the rut of the commonplace, which stimulates us to shake off the robe of ultra-conservatism, and places us in the van of the glorious progress of the present. Without enthusiasm we should degenerate into dullards, and lose all the inspiration there is in life. Enthusiasm therefore should be cultivated and encouraged in our professional ranks, but it must not be permitted to carry us beyond the bounds of sane and sober reason. Enthusiasm run riot will do more harm than good; it is a marvelous force for advancement but may become dangerous unless controlled by the balance-wheel of judgment.

In a calling like dentistry, where so much of the technical enters into the daily work, it is not strange that one of the glories of the profession relates to the ingenuity displayed by men in the development of new ideas and new methods. It would be a monotonous profession indeed were it not for the possibilities presented by the ever-increasing facilities for performing our operations. But the trouble with some of this ingenuity is that it so frequently leads men to the abandonment of methods which have been so long tested by the profession as to be entitled to be called standard.

Nothing is sacred in the old to men who become infatuated with the new. This might be justifiable were it always possible to judge accurately of the ultimate value of the new, but this is not within the pale of human intelligence. The man has not yet been born who can predict with certainty what the future of any method of practice will be. It is true that a passing fad may be so ridiculous that a thinking man can safely prophesy its early abandonment, but the peculiar thing is that this is seldom the kind of prophesying that is done. When the fever of enthusiasm is upon us, we can see nothing but the sunlight and the roses.

The very best of men are subject to mistakes in judgment. At the World's Columbian Dental Congress in 1893, a paper was assigned to the open meeting on the subject of hypnotism. I was on the program committee, and ventured to suggest to those who were in authority in the assignment of papers that it was hardly appropriate that a subject of this character should receive the distinction of presentation before the general body. One of the foremost men in the profession assured me that the essay committee knew precisely what they were doing, and that hypnotism would be an established and universal practice in dentistry in five years from that date.

When cataphoresis was first introduced, I consulted a man who had employed it and questioned him with reference to its virtue. He was a man who is usually extremely conservative, and I had great confidence in his judgment. He said that it was his firm conviction that

within five years there would not be a dental office anywhere without a cataphoric outfit, and that it would prove the greatest factor in successful practice that had ever been introduced into dentistry. Five years seems to be the magic time when all these great reforms are to mature, but it has frequently happened in the past that five years has seen the decline, the death, and the burial in oblivion of many of these promising innovations.

When we read and study the history of the past it makes us pause and wonder what may be the future of some of the things we are so enthusiastic about today. Let us strive for mental balance in our progress, and then that progress will be more secure. In the introduction of new methods an unfortunate tendency is the habit of disparaging the old to bolster the new. We should never forget the fundamental fact that to begin by tearing down the old is not always the safest foundation upon which to build the new. In view of the fact that there is so much room in the practice of dentistry for the employment of every good method, it becomes unnecessary to belittle and criticize those things which have been so long in use as to become established practice, just for the purpose of forcing the attention on something recent.

Of all the older methods of practice there is none which has so persistently been the object of disparagement as the process of filling teeth with gold. At repeated intervals throughout the history of the profession we find men springing up with ever-recurring vigor in a fresh attack upon this method. Every new material that has been introduced into the profession for filling teeth has been heralded as the superior of gold. It is always with gold that a comparison is made, and always to its disadvantage. And yet gold has stood the test of time as has no other material yet introduced. It has been the sheet anchor in saving teeth, while many of its would-be substitutes have fallen by the wayside in the survival of the fittest. This is said at this time not so much with the object of extolling the virtues of gold as to show the

folly of criticizing a method which has been so long established.

When the porcelain wave was sweeping over the profession, it was freely prophesied that the day of the foil filling was past, and men in their enthusiasm predicted the relegation of gold pluggers to the junk heap. If we are to believe the reports of manufacturers, today porcelain inlay furnaces have become more of a drug on the market than foil pluggers, and yet I wish to go on record as saying that I believe the porcelain inlay has a definite and a very important field of usefulness in our practice. If too much had not been claimed for it in the early days of its introduction, it would have sought its proper level sooner and would have today a more firmly established status.

The latest expression of enthusiasm has emanated through the medium of the cast gold inlay. Nothing in recent years has taken so firm a hold on the fancy of the profession as this, and be it said that at present this method bids fairer promise to receive a permanent place in dentistry than has anything that has been introduced in the past decade. But at the risk of being pounced upon by those who are worshiping the new god with so much acclaim, I must affirm that the real and permanent value of the cast gold inlay has not yet been established. Nor can it be, by the very nature of things, till a greater number of years shall have passed than have elapsed since its introduction. It requires time to establish the fact of permanence, and while we have had a sufficiently long experience in its use to prove its title to a firm and definite place in our practice, we do not yet know how long the average cast gold inlay will last. We may say with certainty that it will last long enough to entitle it to a prominent place among our methods, but when we say that it will result in displacing gold pluggers, we are going too far in our predictions unless we wish to acknowledge the ultimate deterioration of dental service. By this I mean that there are many cavities which can be more certainly, more expeditiously, and with better judgment

filled with foil than with an inlay. I say more certainly, because I wish at this time to repeat a statement which I have previously made, namely, that there has never yet been devised by the ingenuity of man a filling material which for absolute protection to the tooth, for permanence of service, and for general utility can compare with a perfectly inserted gold foil filling, or, to be more accurate, in selected cases—a platinum-and-gold filling.

It will at once be said in answer to this that the exactions of gold are such that it is well-nigh impossible to insert a perfect foil filling. This is true in certain locations, under certain circumstances, and with certain patients; but it is by no means true of a large percentage of cases which today are being filled by some other method. The gold inlay came as a real benefaction to aid us in the management of those cases where the conditions are such that we cannot use gold foil with good technique, but it is being used in many cases where gold foil would insure an infinitely better service.

No one realizes more fully than I the limitations of gold, or its exactions. I have a vivid recollection of the days of long operations and nerve-racking strain, and no humane operator would want to go back to that kind of practice. But the improvement in the technique of the gold foil filling renders its insertion a matter of much less discomfort than it formerly used to be, and there should be no excuse on this score for the adoption of some other method in cavities of medium or small size, where good access may be had for perfect adaptation and condensation of the foil. We should not lose sight of the saving properties of gold when inserted under favorable conditions, because it has proved itself to be the most reliable of all materials by years of service, and we should confine our inlay work to cases where the conditions are unfavorable to the proper insertion of gold. Considering it from this point of view, inlay work has come to us as a great and worthy adjunct to our methods of filling teeth, but not to displace older and well-established methods.

Extremes of any kind are proverbially dangerous, and in the wondrous development of new methods, with their fascinating innovations, it seems natural for men to go to extremes. But it is well to call a halt at times and look back over the experience of the past, and see what it teaches us. If this is done calmly and without bias, we shall learn many a useful lesson of conservatism. One of the most significant lessons we shall learn is this—that the chief stumblingblock in the way of real progress and the greatest menace to safe practice is the ever constant tendency among the rank and file of the profession to find an easy way of doing things. The search after the short cut has led many a man astray. It is the siren song which has frequently lured the dental mariner to the rocks of failure and defeat. No thinking man will complain of improvements in technique which facilitate our work and enable us to attain our end with less detail, provided the end attained is up to the proper standard of excellence. But too often the short cut results in imperfect work, and consequently in indifferent service to the public.

We hear the constant cry that the practice of dentistry is very exacting, that men break down under the strain, and this is often offered as an excuse for doing things in an easy way. But men break down in every calling in life, and I am not sure that dentists suffer in this regard more than most men. But even if they did, this would be no excuse for adopting methods which are not for the best interests of the public. This one fact should be constantly remembered, that when a man selects a profession as his life-work, he tacitly obligates himself, or at least he should obligate himself, to consecrate his very best energies to the service of humanity, even if this must be done at some self-sacrifice. I am not arguing for a hard way of doing things when there is an easier way which will bring as good results, but I do protest against the constant shirking of the best service simply because that service is hard. In life we develop through difficulties, and professional work is no ex-

ception. The greatest happiness is to be attained only through service and self-sacrifice, and it is the chief glory of professional life that it stands apart in this one particular from other callings. It has to do with persons instead of things, and the obligation in respect of service is therefore greater.

What then shall we say of the man who calls himself a dentist, but who forces upon his unsuspecting patient service of an inferior quality, just because it is easier for him to perform it? This is said not with particular reference to fillings or inlays but as a general protest against the too frequent tendency of adopting a new method and pushing it to an extreme, before it has been fully tried out, just because it possesses the appealing property of being easily performed.

What we most need in the profession is balance, and it would seem as if the experience of the past should teach us a long-needed lesson of conservatism. In nearly every new method that has been introduced we have gone to extremes, frequently to the detriment of the people whom we are supposed to serve. This is the really serious aspect of our over-enthusiasm, that the ones to suffer most are those who repose confidence in us and are thereby entitled to the protection which a wise conservatism on our part should insure them. Take bridge work for instance, and try to estimate the crimes that have been committed in its name, when everything was being bridged from a wabbling third molar to the operator's conscience. Think of the wrecks

along the line following the distortion of a system which is really a benefaction when employed with discrimination. Consider cataphoresis, and try to estimate the size of the junk heap that would have reared its lofty head to heaven if all the discarded apparatus had been piled in one place during a single twelve-month. Think of the allurements of the all-porcelain plate, the pink celluloid plate, or the filling of glass that could be constructed in a few minutes. Mention has already been made of the rapidly receding wave of porcelain inlay work, and if we were to enumerate all the passing fads that have gripped the profession and have held it in bondage for a period, only to be dropped by the wayside and forgotten, it would require a large volume.

These observations should make us pause and consider more calmly the probable outcome of any new idea that is presented, and above all we should not allow the experience of the past to be ruthlessly trampled under foot by the too rapid marching of the present. While we should deem it necessary in the evolution of the profession to prove all things new, it is just as incumbent upon us to hold fast to that which is good in the old.

This is a most inspiring day in dentistry, and we may well be pardoned for all joining in a grand chorus of acclaim over the wondrous advances of the present, but in doing this let us not forget to pause occasionally and peal a swelling anthem of praise to the glorious heritage of the past.

POST-EXTRACTION SEQUELÆ.

By OTTO E. INGLIS, D.D.S., Philadelphia, Pa.

(Read before the Northeastern Dental Association, at its annual meeting, Hartford, Conn., October 21, 1908.)

AS the conditions occasionally met with as the sequel to extractions are at times associated with much suffering and sometimes with danger from infection, a brief *résumé* of cases which have fallen into the hands of the writer, and which have been of much interest, may serve to provoke some discussion which will add further interest and be of practical benefit.

The cases of simplest pathology, but by no means of least danger, are those of hemorrhage. The writer fortunately has been spared the experience of a death from this source, though cases of persistent or recurrent hemorrhage from the alveolus after extraction, with fatal results, have been recorded. Fortunately, these are rare, and occur in bleeders, whether hereditary or not. In hemorrhagic cases local styptics are indicated, which are usually packed into the alveolus, and if the case is of dangerous aspect compresses are placed over the alveolus, or packings used held in place by ligatures attached to adjoining teeth or by the pressure of the opposing teeth, the jaws being held together by means of a Barton, Garretson, or some other bandage. It is usual to pack a strip of antiseptic gauze into the alveolus; one end of this may be dipped into a mixture of powdered thymol and powdered alum, the antiseptic action of the former and the powerful astringence of the latter adding valuable qualities to the gauze. Other styptics serve well at times, but their enumeration is not essential here, as many are well known.

Internally, calcium chlorid—ten to fifteen grains administered in water and repeated—seems to rank among the best

of the remedies that increase the coagulability of the blood, while ergot is perhaps our best vaso-constrictor for this purpose, a teaspoonful of the wine of ergot every two hours meeting the indications. When the hemorrhage has ceased the tampon is to be carefully removed, and the case kept aseptic and watched until granulation occurs.

Aside from hemorrhage of alarming character, one meets several classes of accidental or inflammatory or necrotic conditions the treatment of which is quite within the province of the dentist, and which are of interest because of their fairly frequent presentation.

Occasionally a plate of the alveolar process has been fractured during extraction. Sometimes this comes away with the tooth, being attached by a tough fibrous pericementum. As this is usually the buccal plate, it presents no more than a question of anticipated resorption of the alveolar process with a tendency to a marked depression at that point, which is of small consequence unless jagged edges are left. If such is the case, the latter should be rounded in order to prevent irritation of the overlying gum tissue. The depression may be somewhat annoying in the arrangement of a prosthetic piece.

Sometimes a large portion of alveolar plate is strained away, but need not be removed if it has a good attachment through its periosteum to the overlying gum and is well inclosed by the ensuing clot, which, if kept aseptic, is the best natural protector of wounds made about the alveolar process. A reattachment of the fractured piece occurs and the part resorbs as usual.

In an interesting case a piece of the antral floor, one-third inch in diameter, was torn out owing to its thinness and its firm membranous attachment to the apices of the roots of a molar. Healing occurred as it would in any case of extraction.

The careless use of alveolar forceps sometimes produces ugly suppurating wounds, which do not receive the post-extraction care to which they are entitled. Cutting a bucco-lingual gash as they do, and perhaps necessarily so, for the case sometimes demands strenuous efforts for the extraction, the operation is only warranted under ante- and post-extraction asepsis; a neglect of this precaution may produce intense inflammation, or a real ulceration. Frequently the reflex pain is intense and the reflex sympathy of pulps in adjoining teeth is excited, causing the pulps to be hyperemic and to respond to even slight changes of temperature. At times this symptom has been as much complained of as pain in the alveolar process. For such a septic condition of bruisehydrogen dioxid is indicated, to be applied upon a swab of cotton, which may be rolled by the patient upon a toothpick; or the dioxid may be held in the mouth and be worked into the parts by means of the tongue.

Phénol-sodique and laudanum, equal parts, may be carried by the patient in a homeopathic phial, and be applied by means of the finger-tip. If swallowed, its local sedative and antiseptic effect is aided by the narcotic effect produced.

Glyco-thymoline, borolyptol, borine, or any of the proprietary antiseptics can often be conveniently dispensed in the sample bottle, and does much good locally. If the pain is severe at night an opiate may be given for the induction of hypnosis and narcosis.

Gangrene of the gum margins with sloughing may be caused by cocain injection if the injection be made too forcibly or with an infected needle, or by the bruising of the gum in extraction, with subsequent infection. This may occur in a gum margin between teeth as the result of violent treatment and infection

during any filling operation; in this case teasing off the gangrenous tissue and the use of the same remedies are indicated.

A post-extraction effect of similar character as to painfulness, but differing in its pathology, is the so-called dry socket. Of this there are two classes. In one the alveolar walls are either totally or partially uncovered by clot or granulations, while the touch of an instrument elicits the fact that apparently bare walls are highly irritable—in other words, that there is a septic inflammation of the medullary portion of the alveolar wall. There is some inflammation and swelling of the buccal and lingual gingivæ, while the gum margins may be highly inflamed.

The writer believes that this condition is primarily due to a solution of the clot as the result of a lack of firmness of coagulation; that is, the patient by frequent lavage, suction, etc., has succeeded in dissolving out the bulk of the clot, and the added sepsis has further liquefied any clot remaining upon the alveolar walls. The soft tissue of the bone, which ordinarily throws out the granulations, becomes highly inflamed, and reflex pains simulating those of odontalgia, but of a more persistent and severe nature, may persist for days, and bring about insomnia, anorexia, intestinal disturbance, and complete prostration of the patient.

Another cause is the packing of cotton tampons containing analgesics into the alveolus, and leaving them until they become septic. The clot is prevented from occupying its normal place and sepsis is introduced. The pathology in this case is therefore the same. Bruising of the alveolar lining, the result of violent extractions, especially of hypercementosed teeth, has the same effect.

In these cases the socket should be washed repeatedly with a germicide to remove the bulk of infective material, and a sedative antiseptic should be used. If the pain is intense, more immediate relief may be obtained by the use of acetate of morphin, one-eighth grain thinly distributed in eugenol or phenol-camphor. After the alveolus has been

dried with cotton and the mouth napkined, a pledget of cotton saturated with the mixture is gently packed into the alveolus.

If possible, on the same day, or, if applied in the evening, on the next morning, a pellet of cotton saturated with phenol-camphor or eugenol should be rolled in powdered orthoform and applied. The orthoform may be used at once in cases in which the pain is not so severe; it is analgesic through the production of its anesthetic effect, also antiseptic. A paste of orthoform, zinc oxid, and vaselin may be spatulated in successive portions into the alveolus until it is filled. These dressings should be removed frequently enough to insure activity of the remedy, say twice a day for the cotton, or each twenty-four hours for the paste. As soon as granulation can be observed, it is well to induce a clot, first douching the alveolus with an antiseptic, then drying under a napkin and gently scratching the granulation with a large sharp clean spoon-excavator. Sufficient blood should be drawn to overfill the alveolus, and it should be allowed to clot as firmly as possible. All forcible washing should be forbidden. The case is thereafter seen daily, and any sluggish parts stimulated by curettage until all parts are granulating nicely. The patient at all times must keep the teeth cleansed, especially after meals, and should use a small syringe or curved dropper to gently flush out the alveolus if food gets into it.

As a tonic and intestinal antiseptic meeting the indications of loss of tone and intestinal disturbance common in these cases, quinin and salol in the stock combination of two and one-half grains each should be administered three times a day. A laxative, or even saline cathartic, is useful in the early stages of the treatment to overcome the effect of the morphin upon the bowel.

The above method is much slower than the use of a surgical bur to remove the superficially ulcerated tissue, and the latter method may be resorted to if desired, under local or general anesthesia, provided the general demoralization of the

patient does not prevent. The surgical method may be taken up at any stage after the first analgesic treatment if the patient will consent. It is surprising how much relief can be given by the free cutting away of the ulcerated tissue. It seems as though the rough treatment produces less pain than the rodent inflammation.

In some cases which were cut freely at once and without any anesthesia, local or general, the patient has expressed great satisfaction within fifteen minutes; and ordinarily not over two cuttings have been required to produce general granulation of the alveolus.

In the second class of cases of dry socket, the bone is bare, hard, and insensitive to touch, which indicates the superficial death of the cellular elements. The case is then one not of superficial but deep ulceration, with superficial bone necrosis. It is a later stage which is often present several days or a week after extraction. There is considerable reflex pain, but it may not be so intense as in the previous class of cases.

The necrotic area should be removed, which is best done with a surgical bur, either round or bud-shaped. The part affected and the mouth having been sterilized, and the hands and instruments having been rendered aseptic, nitrous oxid or somnoform may be administered and the bone be freely cut to a depth sufficient to expose the more cancellated structure, which contains soft structure more readily capable of granulation. The alveolus is washed out to free it of débris, and the blood is allowed to clot as though an ordinary extraction had been done.

While this is without doubt a more radical and rapid method, the writer has frequently done the work under cocain anesthesia, and sometimes without anesthesia.

In the latter method the idea is to bur until the patient notes sensation, which indicates that a vital spot has been reached; a new spot is then touched. In any case, drilling into the antrum or into the inferior dental canal is to be avoided. It is, however, rather the lat-

eral walls than the apical portion of the alveolus that are usually involved, and here caution is sometimes required not to scrape away the pericementum of the adjoining tooth at the cervix if vital, as at this point the bone may be absent.

The application of strong nitric acid to the dead bone will cause its solution, and sometimes will serve instead of the simple operation when the dread of the patient is hard to overcome.

The neglect of these cases of dry socket may lead to more involved cases of caries and necrosis of bone, necessitating surgical operations under general anesthesia, or to such a degree of osteomyelitis that a general infection may result. The writer has treated so many cases, seen early, by simple curettage, that he feels little anxiety if they are due to complete extraction, provided they are seen reasonably early.

A recent case which caused some trouble may, perhaps, be described with benefit:

A young man had a broken-down lower right third molar, which necessitated extraction in two portions. The case was referred to a professional extractor, who removed the mesial root entire, but broke off the distal root, leaving the apical half or third in place. Excruciating pain resulted, which the patient bore for several days until almost exhausted, because he supposed nothing could be done. The entire mesial socket was bare and the bony septum exposed upon its oral aspect. The margins of the alveolar bone were exposed, and the gum margins were highly inflamed, but there was no facial swelling of moment, which fact excluded an apical abscess upon the distal root.

At the first visit after the condition was established no relief could be obtained from orthoform, and the acetate of morphin and eugenol mixture was tried with satisfaction. This was repeated for a couple of days. Quinin and salol three times a day, together with a mastic and aloes pill at night, toned the patient up, and he was directed to use hydrogen dioxid freely with a glycothymolin dropper. After twenty-four

hours of this treatment, curettage was attempted without an anesthetic. About five curetments were made on alternate days for about ten days. Wherever a bare spot remained it was touched up with the bur. Each time a clot was allowed to form, but the antiseptic washings were continued. The mesial and apical side of the mesial socket granulated first, the granulation gradually extending up the distal side of the mesial socket and growing in from the buccal and lingual sides over the septum. At the present time the patient is comfortable and recovering the weight which he lost. The distal root still remains with a sinus over it awaiting extrusion.

It would have perhaps been better to have proceeded surgically with a case of this sort, and in the course of such an operation the root would have been removed. The patient, however, had been through such a severe experience and had in addition such a dread of anesthesia and operations, that he begged for some less radical measure.

When it is considered that this alveolus was widely open and bare to a point in proximity to the inferior dental canal, the case was cured by treatment which deserves some consideration.

In another case of extraction of a lower third molar for pulpitis, the consideration of septic pericementitis as a factor may be excluded.

The patient bore the reflex pain for ten days before consultation. The alveolar bone was entirely insensitive, and eight curetments were necessary before granulation was safely under way. This case came the nearest of any to being a failure under this treatment in my hands. Not until the bone was cut almost to the inferior dental canal could granulation be induced in the apical portion of the alveolus, but just as I began to despair lest surgery under general anesthesia would be necessary, the granulation started in that location, and progressed to a complete cure.

It is not contended that this method is as valuable scientifically as immediate complete surgical treatment, but it is often more satisfactory, and keeps the

patient upon his feet and able to attend to his duties. The point of value in this treatment is that an aseptic clot over tissue capable of granulation is the best occupant for the alveolus after extraction. Granulations alone, when filling up an alveolus, usually leave an area of depression at the summit of the alveolar ridge which collects food, to the annoyance of the patient.

While antral openings are not usually sequels to extraction, it has happened that teeth have been pushed into the antrum. In such a case the tooth must be removed, or neuralgia or antral empyema or both will probably result. In several cases openings into the antrum have been coexistent with abscessed teeth or roots. Such cases demand extraction of the teeth and a thorough surgical removal of all dead bone, with antiseptic lavage or packing of the antrum, when usually the floor of the antrum will heal over, especially if a small partial plate is made to prevent food from entering. Some slight irritation of the opening may be necessary in some cases.

This paper would hardly be complete without some reference to the question of extraction during the second stage of apical abscess, or that stage in which

the pus is dissolving the bone. It has been held that in such a case it is better to await the discharge of the abscess before extraction, and it has been stated that secondary swelling may occur. Now, while the possibility of this is not to be denied, the vast majority of cases are cured by extraction, and if such a result be feared, a bit of antiseptic gauze may be packed into the alveolus to form a drainage canal, after thorough sterilization with hydrogen dioxid has been performed. This must be changed every day, at least as long as it may be desirable to keep the alveolus open, and meanwhile rigid antisepsis of the mouth must be insisted upon. When it is noted that the inflammatory symptoms are subsiding, the gauze should be removed and a clot induced. If secondary symptoms should arise after a clot has filled the alveolus, and access to the apex of the alveolus should be essential, it would be an easy matter to sweep the clot from the alveolus with a bistoury, after which the antiseptic treatment may be administered.

It has been claimed that pneumonia may follow extractions in such cases, but the writer cannot recall any such experience in his practice.

SOME IMPORTANT TRUTHS REGARDING ORTHODONTIA.

By **ALFRED P. ROGERS, D.D.S., Boston, Mass.**

(Read before the Northeastern Dental Association, at its annual meeting, Hartford, Conn., October 21, 1908.)

DEPARTING from the usual custom of the orthodontist, I shall attempt to treat this subject without the aid of illustrations. This is not because I disbelieve in their value; in fact, I share with my audience the opinion that there are few better methods of education and no more vivid means of imparting an idea, of creating a sentiment, or of illus-

trating a truth than those offered by the use of pictures. We have only to look through our art galleries to be convinced of this, because the greatest events in history, in science, and literature have been made to live and to reflect through all ages the events which these galleries were created to illumine.

Although realizing, then, the value of

pictorial teaching, I am making this departure for a very earnest reason. I have some things to say which, although they may be somewhat crude in form and lacking in literary finish, are nevertheless intended to convey deep and important truths—not meaning by this that they are important to us alone, but that they are of greater importance to the many thousands of children who today are about to experience serious malformations of the jaws and teeth.

The great principle of prime importance that I would desire first to impress is the principle of *prevention*. We continually talk of treatment, and frequently show cases, but it has occurred to me that in order to be of the greatest good and to impart to our education the greatest value, we must reach down deep, even to the roots of the matter, so that each one of us may fit himself to assert his influence in our combined efforts toward overcoming in their inception those difficulties which are so obstinate when allowed to develop.

There are two classes of men who should be most interested in child life and infantile development; these are the physician and the dentist. It seems to me that these men above all others should make themselves proficient, by observation, in detecting the causes which produce these disastrous and difficult conditions in children. This work is the work of education—first of ourselves, then the people, who must be taught how best to rear their children.

All that has just been said relates to prevention; now I wish to draw attention more closely to its significance. To prevent calamity, to prevent sickness and deformity—in other words, to prevent the evil tendencies in man's development and to substitute healthy and good tendencies—is one of the worthiest objects of life, while to be blind to this fact means the loss of one of life's greatest opportunities; for have we not learned by bitter experience that when calamity comes to us it cannot then be averted, that when sickness comes it cannot always be cured? Why have we so frequently in our practice lost sight of this fact? Is it simply

because we have been so overwhelmed by our work of repair and by the curing of disease that, as a profession, we have had little time or energy left to investigate the causes and to set in motion those other forces which are calculated to prevent disease? Fortunately we are now beginning to realize this, and many successful efforts have been made, not alone by the medical but by the dental profession as well, toward the prevention of sickness and the arrest of decay, as the good work which is being done in the effort to check tuberculosis fully testifies. It seems that the time is now ripe for turning the attention of the profession not alone to the early treatment of malocclusion, but to the necessity and possibility of prevention. The time will surely come when a case of excessive malocclusion in a family whose children have been sent regularly to an intelligent dentist will be a rarity; yet today it is a common thing to find the most astonishing conditions of malocclusion developing among all classes of people. There are literally thousands of children who are just on the borderland of conditions which, if not corrected or prevented, will surely assume serious dimensions.

Our most curious if not our greatest blunder regarding malocclusion has been the almost universal habit of telling our patients to wait until the teeth have all erupted. I understand that even today, after so much has been written and spoken on this subject, there are men who are willing to still give the same advice to the anxious parent when they are consulted regarding a child's teeth. A little reflection, a little thought on the part of the dentist should render it impossible for him to give such advice, and a little intelligence and a little education on the part of the parent should render it impossible for him to receive it. For, in looking squarely at this matter, it is very easy to see that the real cause, the factor of the greatest importance in the etiology of malocclusion of the teeth, is retarded development of the facial bones. It follows, then, in logical sequence, that the first thing for us to ascertain is the cause of this lack

of development, whether it is a lack of nutrition or a lack of use, or both in combination. It is seen clearly enough where our immediate duty lies, but to really hit the mark in our efforts to prevent malocclusion we must learn to look back even before the birth of the child. There is not the slightest doubt that there are many prenatal causes which must be guarded against; but as to how and when this should be done we are not yet sure.

If it is possible for a nervous impulse, or whatever else it may be termed, at a very early period after conception, to arrest the development of the facial bones sufficiently to cause cleft palate, is it not also possible that other prenatal influences at other periods may result in arrested development of the facial bones of the unborn child? Taking this idea as our primary one, the physician and the dentist must begin their observations and gradually build up their knowledge so that in time it will become accurate and scientific—to such a degree that by the careful education of the mother and by the systematic building-up of her physical condition such results will become more uncommon. Today we have at our command practical methods that can be employed in the early stages of the child's life, methods that we already know to be needed, methods which we are convinced will give results.

It is a well-known and undisputed fact that the lack of use in any organ means retarded growth. This applies to the mouth, the teeth, the jaws, as well as to any other part of the human body. Therefore it is necessary that we insist that the infant in its effort to obtain its food must be forced to work for it sufficiently hard to stimulate a healthy blood supply in the facial bones and muscles, and as time goes on and the child arrives at that stage where solid foods must be administered, we must learn to discourage the method of feeding children with soft food, and nourish them in such a way that natural stimulation will not be lost. By this I do not mean that we must feed our infants on brittle and unyielding crackers, because I am convinced that with the very young such food

constitutes a positive danger, having known a friend to suffer the loss of his three-year-old child from the use of this kind of food. It seems more sensible to allow the child to take tough foods, such as the crust of bread, requiring an effort to pull them apart, rather than the kind of food which snaps and breaks and falls to pieces on being crushed. Again, the constant and intelligent care of the child's deciduous teeth must be seriously considered by every practitioner. No dentist should allow himself to sacrifice any one of the deciduous teeth without maintaining the space which it occupied by a safe and delicate appliance.

In his observations of the children's very early stage of growth, regarding the danger of malocclusion, the intelligent dentist must be ever on the watch as to habit, since children are so addicted to habits of various kinds that these become fixed before the parent or the dentist becomes aware of them, ugly and unyielding deformities sometimes resulting. The breaking of these habits requires skill and forethought, and no one unable or unwilling to give these habits serious consideration is worthy to be the guardian of the mouths of little children. The rational treatment of habit does not consist in the application of force, or of anything that will humiliate the child, but goes directly to the root, to the seat of habit, the mind. Our first step in breaking a child's habit is to gain its confidence and respect, and then to explain to him the serious nature of the habit, the evil consequences that result if it is persisted in, the impossibility of curing the deformity unless it is abandoned; in a word, by care and tact and teaching we create a desire in the child's mind to get rid of that which is harming him, and then stimulate this desire until it becomes so strong that the will is brought forcibly into play and the habit is consequently abandoned. I have used successfully this method in a number of cases in which nothing else seemed to be effective. We too often forget that the child can think and reason sometimes as well as a grown person, but we must take the initiative and direct his mind,

forever abandoning those senseless commands which are repeated so often that the child soon regards them lightly.

Should you, by some unfortunate chance, have a case among your child patients that has developed into a state of malocclusion, it is proper to begin the treatment immediately. If the adenoids have been removed and the mouth-breathing has been corrected, if the foods have sufficient toughness to cause a rational amount of stimulation—in a word, if everything has been done that a thoughtful and educated dentist can suggest, and still the malocclusion is persistent, it will probably be noticed in the anterior segments of the upper and lower arches at about the fourth or fifth year, or in the mesial or distal relation of the two deciduous arches. If the former be the case, that mild form of stimulation which is to cause sufficient interdental growth should be applied. If the second condition should present itself, the arches should be brought into their correct mesio-distal relation prior to the eruption of the first permanent molars. During all this time of early childhood the one great thought to be kept in mind is the stimulation of osseous development, and when stimulation is applied

correctly and sufficiently it will not be long before we shall notice a marked decrease in the pronounced cases of malocclusion.

Regarding some so-called treatments of malocclusion, it must be admitted that sometimes it is easy to criticize some of the methods still used for the correction of the condition. It is a fact that upon receiving our diplomas we step out into the world with the confidence that we are fitted to practice any branch of the dental art, but, of all of these branches, that one which we comprehend the least and in which our instruction is usually most fragmentary is the subject of orthodontia. Although by law we are given the privilege to practice dentistry in all its branches, yet there is, I believe, a higher law that applies to every man, whatsoever his calling may be, which says that we are fit or unfit for this work or that. But why speak of this truth? Simply in order to emphasize what you already believe and know, namely, that it is wrong to try to make ourselves believe that we can accomplish that for which by temperament and training we are unfit. It seems that in this age of progress there is ample opportunity for each one to find the work for which he is best suited.

SOME BORDERLAND PROBLEMS OF MEDICINE AND DENTISTRY : A PRELIMINARY REPORT.

By HENRY GLOVER LANGWORTHY, M.D., Dubuque, Ia.

(Read before a joint meeting of the Dubuque District and Dubuque County Dental Societies, September 23, 1908.)

THE importance of the mouth as a source of disease to the general system can no longer be overlooked. Dental writers have devoted some, but not sufficient space to this subject, while the general medical profession has only just begun to realize the necessity of care in this direction. Dr. Truman (¹) has

aptly said: "It is for the dentist to understand that he is to a large degree responsible for the general health of his patient as far as the mouth is concerned, and he should insist on prophylactic measures that will at least reduce this source of disease to a minimum." Although a specialist I am free to con-

less that I am but beginning to learn how to examine the mouth in all its particulars. We have surely held the examination of the teeth as of too little importance. At present one is inclined to believe that a far better prognosis might be made in most instances if plans for treatment included the examination and the restoration of the teeth as well as the nose and throat to a normal condition. As there is little available literature on this phase of dentistry and medicine which really covers the ground, the field may roughly be classified or rather presented as follows:

(1) *Résumé* of actual clinical cases bearing on otalgia dentalis, rheumatism, cervical adenitis, bronchial asthma, adenoids and enlarged tonsils, trifacial neuralgia, etc.

(2) The mouth in its relation to stomach, intestinal, and other general diseases.

(3) Influence of imperfect nasal respiration on the oral cavity.

(4) Faulty eruption of the teeth as a cause of nasal deformity, particularly nasal spurs and deviations of the septum.

(I.) CLINICAL CASES.

Case I. E. A., female, age twenty-three. Diagnosis: Otalgia dentalis. History: No previous ear trouble until five months ago, when she was said to have experienced a sudden pain in the right ear followed by a discharge lasting three days. Mastoid bone slightly tender at that time (?) Has suffered from intermittent attacks of pain in the right ear ever since. Has never had chills, fever, or vomiting, and is unable to assign any cause for trouble. Present illness: Pain in the right ear for three weeks; no discharge, no chills, fever, or vomiting. Says that she is suffering from a severe earache; has also complained of pain in and about the throat, together with slight soreness. Case referred by Dr. J. M. Walker of Dubuque, Ia. Examination: Both ears normal. Hearing test normal. Nose and throat negative. Examination of the teeth disclosed upper right carious first and second molars.

Patient referred to a competent dentist for treatment.

This type of case is frequently seen by the specialist. The patient gave a history of ear trouble, but I felt sure that

her statements in regard to this point could not be relied upon. The earache was reflex, and had its origin in the teeth. The slight throat soreness and pain throughout the pharynx were also reflex in origin. Not infrequently wandering pains throughout the pharynx may be due to altered conditions of the teeth or gums. When told that the earache was due to the teeth the patient expressed disbelief, and was only convinced when the treatment of the teeth resulted in a cure. Otalgia or earache may possibly be classified as a neurosis of the sound-conducting apparatus. The pain is caused by affection of the sensory nerves supplying the ear. It may occur from a number of causes, such as a localized ear disease, part of a trigeminal or cervico-occipital neuralgia, or may radiate from ulcers or newgrowths of the larynx, naso-pharynx, and even from caries of the cranial bones. The differential diagnosis between otalgia and actual inflammatory pains can only be made by inspection and by noting the absence of inflammatory phenomena.

Case II. M. W., female, aged twenty-one. Diagnosis: Otalgia dentalis. Past history: Has been in poor health for some three years, under the care of her family physician, Dr. Wieland of Dubuque, Ia. Present illness: Pain in the right ear for six months, worse last two weeks. History of dental work on upper right molars two years ago by the family dentist, Dr. J. A. Meshinger. Pain in the ear sometimes so violent during the night as to prevent rest. Unable to assign cause for earache. No loss of hearing. No tinnitus or ear noise. Exposure of the side of the face to a cold blast of air will start a pain in front of the right ear. Examination: Both ears normal. Hearing test normal.

Referred to her dentist for examination of the teeth.

My own examination of the teeth did not reveal sufficient pathological alterations to conclude positively that the teeth were the cause of the trouble. The condition, however, as I viewed it, was due directly to conditions in and about the teeth and not to trifacial neuralgia. Certainly, if the trouble were dental in origin, treatment would alleviate the pain and prove one's conclusions. If the pain,

on the other hand, was in some branch or connection of the trifacial nerve, dental work must surely prove disappointing. The patient was too young, it seemed to me, to give any serious thought to trifacial neuralgia as a diagnosis. The dentist, Dr. Meshinger of Dubuque, Ia., reported that after considerable search he was able to find caries of one of the upper molars close to and practically hidden by the gums. Proper attention to the teeth established a speedy cure.

As a matter of interest it may be mentioned at this point that neuralgic pains sometimes shoot toward the ears from chronically enlarged tonsils. Acute tonsillitis is another prolific source of radiating ear pain without inflammation of the ear itself.

Case III. L. H., female, age thirty-nine; first seen in June 1907. Diagnosis: Sore throat, rheumatic. History: Has complained of sore throat and pain throughout the pharynx for two weeks. Ache increased at night. Last two days more severe on the left side of the throat. Had rheumatism one year ago. Has complained of slightly enlarged and tender glands in the left side of the neck. Examination of the throat was negative. The teeth were recently placed in excellent condition under the personal care of Dr. J. V. Conzett of Dubuque, Ia. His report indicated that there seemed no reasons to suspect the teeth as a local cause of trouble.

After further questioning I came to the conclusion that the throat pain and soreness was rheumatic in origin, very likely preceding a mild attack of articular rheumatism. With this in view, I suggested a treatment of sodium salicylate in 15-grain doses, proper diet, alkalies, etc., and referred her to her family physician, Dr. J. R. Guthrie, also of Dubuque, Ia., for general supervision and confirmation of my diagnosis.

One week later the joints became swollen and the patient experienced a moderate attack of articular rheumatism. Last week she again came to me complaining of pain in the left ear, which she had noted for about six weeks. Examination showed a chronic middle-ear catarrh with slight reduction in hearing power. Other than the above, the drum was normal. Knowing her history and having been assured by Dr. Conzett that her teeth were in excellent condition, I came to the conclusion that the attack of ear pain was also rheumatic in character.

A few cases of neuralgia of the throat have been reported, which of course must be differentiated from rheumatism, muscular or articular. Anemia and chlorosis are also commonly given as the cause of throat neuralgias.

Case IV. K. C., female, age seventeen. Diagnosis: Impacted ear-wax, otalgia dentalis. Past history: No previous ear trouble. No history of head cold. Has complained of increasing pain in the right ear for two days. No discharge. Mastoid bone not tender. Examination showed the canal of the ear filled with wax and probably pressing on the drum membrane. Wax removed and drum found normal. Hearing test normal. One lower molar carious.

My first impression was that the wax might have caused sufficient pressure upon the drum membrane to result in local pain. The other possibility was that the teeth were causing the trouble as per a reflex otalgia. Determined to discover the cause of the trouble if possible, I requested the patient to refrain from consulting a dentist for a few days and to note whether the pain ceased spontaneously after the removal of the wax plug. If not, the conclusion must be self-evident that the pain was purely reflex in origin. The patient unfortunately was lost sight of, as she did not return to the office.

This is but one of many cases in which the services of both dentist and aurist may be required to secure the quickest and best results for the patient. With more frequent consultations between the dentist and specialist, cases which now drag along for months on expectant treatment will obtain relief in two or three visits.

Case V. A. H., girl, eight years of age. Diagnosis: Right cervical adenitis, adenoids, carious teeth. Examination: Child poorly developed and nourished. Moderate swelling of the glands of the neck. Adenoid present in the vault of the pharynx. Fetid odor to the breath. Extensive dental caries everywhere, especially of the molars. Treatment: Removal of the adenoid. Syrup of iodid of iron, five minims four times daily.

Referred to dentist for necessary treatment.

Since the lymphatic system begins in the microscopic crevices between the cells of almost all tissue, they become the receptacles for infection as well as for the normal fluids which exude from adjacent bloodvessels and tissues. The course of the fluid always being from the periphery toward the center, it readily follows that infected material may be literally "sucked up" and carried internally. For this reason the lymphatic system has been rather well named the "absorbent" system. The deep cervical nodes lying along the course of the internal jugular vein actually receive at times almost the entire lymph from the head and neck; hence a filthy condition of the mouth and throat causes ready infection of tissues and organs elsewhere.

Case VI. E. G., boy, age nine. Diagnosis: Adenoids and enlarged tonsils, stomatitis, carious teeth, anemia. Patient poorly developed and nourished. Restless at night, irritable, wandering pains about the head; backward at school, mouth-breathing, frequent attacks of sore mouth. Examination: Both tonsils enlarged, adenoids present in the vault of the pharynx. Mouth foul. Gums inflamed and sore, with a few superficial ulcerations. Teeth decayed to a marked degree. Putrid food material lodged between the teeth and along the edge of the gums. Treatment: Removal of the adenoids and enlarged tonsils. Mouth-wash of Dobell's solution one-half strength.

Referred to competent dentist for treatment.

The importance of the lymphatic communications with the mouth, teeth, tonsils, adenoids, and throat in general is often overlooked. Roughly stated, the dental glands drain into the anterior cervical group of lymph glands, the tonsils into the anterior group alone, while adenoids may contaminate either the anterior or posterior chains. Clinically, therefore, as was pointed out in case V, infection along any of these routes may be carried to all parts of the body. To be even more specific, let us take an infection of the tonsil and trace its source. The tonsillar lymphatic vessels draining into the deep cervical chains beneath the sterno-cleido-mastoid muscle finally reach

the thoracic duct, which in turn empties directly into the general venous system, carrying infection to more remote parts and reducing the general body resistance toward disease.

Case VII. Boy, age ten. Diagnosis: Left chronic adenitis, gingivitis, carious teeth. History: Chronically enlarged glands on both sides of the neck for about eighteen months; degree of swelling not great—much less than one finds in acute adenitis and less than in the tuberculous form. No constitutional symptoms. No tendency to suppuration. The glands have increased slightly from time to time, remaining stationary for a time and sometimes subsiding. In the last three weeks the glands have increased in size and they are slightly tender. Examination: Many carious teeth, broken-down roots, and a few dental abscesses about the roots from which pus can be expressed. Smear shows principally streptococci, staphylococci, spirilla, with unknown bacilli, etc.

The first step in treatment must be a differential diagnosis of the origin of the adenitis. Chronic adenitis is differentiated from tuberculous adenitis by the absence of caseation and suppuration, and the presence of a definite existing cause as found in the mouth. Knowing that infectious processes of the nose, mouth, throat, or bronchi frequently cause acute swelling of the lymph nodes in the neighborhood which subsides when the cause is removed, I felt sure that with careful oral asepsis and appropriate treatment of the teeth the condition would clear up. The treatment prescribed was as follows: Flaxseed poultices to the neck frequently, cod-liver oil, and syrup of iodid of iron, 20 drops three times daily.

I am constantly finding that the prolific causes of many of these cases of simple chronic adenitis of infancy and childhood can be found in the mouth or throat from such causes as decayed teeth, enlarged tonsils, adenoid vegetations, etc. As so well expressed by Holt: ⁽²⁾ "Catarrhal conditions of the mucous membranes, associated with foul mouth, are important in relation to all acute infectious diseases which affect these mucous membranes."

Case VIII. E. G., boy, age ten. History: For some months child has had attacks of bronchial asthma, consisting of brassy cough, difficulty in breathing, occasional whoops; these attacks have continued intermittently. Has never vomited after an attack. Attacks rarely last over a few hours, or possibly a day, and are relieved somewhat by medicine. Has been under the care successively of Drs. James Alderson, J. R. Guthrie, and J. H. Schrup, all of whom were able to give temporary relief. Attacks number from five to six a year. Examination: Adenoid in the vault, chronic granular pharyngitis, and many carious teeth. Larynx negative. Chest negative.

Believing that these attacks, which resembled bronchial asthma more than anything else, were due to one of two causes, or possibly both, I recommended prompt attention to the teeth and at the same time removed the adenoids. The attacks have not returned. I am unable to say positively whether the cause lay solely in the teeth or in the presence of adenoid vegetations.

One finds in dental and medical literature a few cases of bronchial asthma, and even transitory attacks of epilepsy, due to impacted molars and other pathological conditions surrounding the teeth. Neurologists are beginning to appreciate the fact that an impacted molar pressing on a second molar, as revealed by the X ray, is capable of causing reflex irritation symptoms elsewhere. Upson (*) in a short paper on "Nervous Disorders Due to the Teeth," points out that "A careful routine examination of the mouth in cases of obscure nervousness, of anemia, dyspepsia, chronic fever, sweating, and rapid heart action will in many cases, in the absence or the presence of lesions elsewhere, disclose irritative or septic conditions in the mouth." He would consider the teeth as viscera, and viscera much neglected by the medical profession. Arguing that diseases of other viscera, digestive and pelvic, cause depression, insomnia, and a chain of nervous symptoms, the inference seems warranted that the teeth in melancholias, and neurasthenics should share the honors of a medical examination equally with the contents of the chest, abdomen, and pelvis.

Case IX. S. C., female, age nineteen. Past history: No previous ear trouble. Has always enjoyed good health. Present illness: Pain in the left ear for three weeks; no discharge. Pain worse at night; unable to sleep on account of it. Mastoid tenderness for three weeks. Examination showed a few boils in the left external auditory canal. The boils were incised. No middle ear or mastoid trouble. The pain continued after marked improvement and healing of the boils in the canal. The conclusion seemed reasonable that most of the pain must be reflex in origin from some other part of the head—as, for instance, the teeth—or possibly might be neuralgia from some of the nerve plexuses in the cervical region. Pain so bad at night as to require morphin.

Patient referred to her dentist, Dr. J. P. McParland of Dubuque, Ia., who has kindly furnished me with the following report: "Second left molar carious; nerve exposed. Nerve killed with arsenic. Upper right second bicuspid carious; nerve also killed with arsenic. Lower right first molar carious. Four fillings inserted. No pyorrhea alveolaris. Impacted third left molar."

Pain less after dental treatment, but still sufficient to necessitate the use of aspirin gr. v at frequent intervals. Having examined the ear and carefully followed dental treatment, I came to the conclusion that the remaining pain throughout the neck was from a neuritis which could only be relieved by proper attention.

This case is interesting, as showing that often a diagnosis can be made only by exclusion. Pressure in this case in front of the ear was sufficient during the early stages to start pain. Another feature which had to be considered for a time was hysteria. Not infrequently one encounters hysterical pain in the ear, with mastoid tenderness and other curious and puzzling symptoms.

Case X. C. D., male, age sixty-nine. Diagnosis: Trifacial neuralgia. History: Severe neuralgia in area of distribution of the right superior maxillary branch, first noted one year before. Pain is paroxysmal, increasing in severity, and has already begun to keep patient confined to his room and interfere with eating. Pain started by pressure on the side of the face or nose, and even by talking. Cold air striking in front of the ear has been sufficient to start the pains. Of late, intervals of freedom from pain have

become fewer in number. Handling the mouth and lips is sufficient to precipitate a paroxysm. Five months ago the upper teeth were extracted without relief.

This case is a typical one of *tic douloureux*, frequently seen in elderly people. It is an affection which renders the life of the sufferer thoroughly unhappy. Not infrequently the pain in trifacial neuralgia may appear to originate in the teeth. Roughly, the symptoms of this disease may be summed up as follows: Occurrence usually in elderly people from fifty to seventy-five years of age. Etiology not often apparent. Pain may begin as a simple neuralgia almost anywhere on one side of the face, jaw, or supraorbital region, and gradually spread into the other sensory areas of the fifth nerve. Pain may be intermittent or almost constant—subject, however, to terrific exacerbations, the so-called paroxysms, which last from ten to thirty seconds. The paroxysms are intense, and sufficient in some instances to wring forth cries of agony. The majority of the cases have had their teeth extracted at some time or other. The paroxysms are prone to originate about one corner of the mouth and spread across the face, and into the forehead, eye, and temple. When the first branch (ophthalmic) is affected, the pain is supraorbital, radiating over the corresponding side of the brow or top of the head. Tender points may sometimes be discovered on the upper lid, notch, and side of the nasal bone. Pain in the second (superior maxillary) branch is generally located on the cheek, side of the nose, and in the mouth and teeth. Tender points may occasionally be found over the malar bone, infraorbital foramen, gums, hard palate, etc. In neuralgia of the third (inferior maxillary, mandibular) branch the pain is found chiefly in the lower jaw, tongue, corresponding portions of the face, and in the parietal and temple regions. Tender areas are often located in the temple and over the inferior dental foramen. The diagnosis in the early stages may be difficult.

(II.) THE MOUTH IN ITS RELATION TO STOMACH, INTESTINAL, AND OTHER GENERAL DISEASES.

As expressed by Baker (⁴), the fact that "Diseased teeth are a cause of other ills of the human body has long been known to medical science, but that the control of these dental diseases is a decided advance in preventive medicine is not generally recognized." This statement is true not only of the teeth, but must be made to include the nose and throat as well. Thorough examination of the mouth, besides being essential in local oral disease, is of great value in the investigation of many general disturbances. For this reason a proper study of the mouth should comprise inspection of all structures such as the teeth, gums, lips, tongue, floor of the mouth, salivary glands, nose, and throat. Until this be done, progress, bacteriological or clinical, will be necessarily slow.

The remote effects of oral infection occur chiefly in two ways:

First, by direct absorption of toxins or bacteria into the circulation from such processes as carious teeth, inflamed gums, stomatitis, alveolar abscess, and bone necrosis; and second, by infiltration of food from putrid deposits about the gums and teeth, making a mixed infection constantly passing into other cavities, *i.e.* the throat, lungs, stomach, and intestines.

Types of the first class of cases are well illustrated in the clinical series of part I, and in the systemic symptoms of fever, prostration, headache, and general malaise.

The second class is best seen in the relation of the mouth to gastro-intestinal and respiratory diseases to be described.

Contamination of food is important in causing decay of food within the body, the poisons of which frequently cause secondary gastric catarrh, various forms of auto-intoxication, anemia, nervous debility, and appendicitis. A foul mouth and decaying teeth, particularly in children, decidedly increase the chances of catching such contagious and infectious

diseases as scarlet fever, diphtheria, measles, and tuberculosis. A clean mouth will do much to prevent tubercle bacilli gaining a foothold in the body. Wadsworth⁽⁵⁾ remarks: "From the hygienic standpoint the secretions of the mouth constitute the chief if not the only source of respiratory infections, and the infectious material is transferred from one person to another, in some cases through the air as from sneezing or coughing, and to an even more serious extent by personal contact or by the use in common of the various accessories of life." Certainly the connection between carious teeth and tuberculous glands in the neck as outlined in some of the clinical cases in part I is direct. Emerson⁽⁶⁾, although having no figures to prove his assertions, is sure that "mouth-infections involving the fauces and tonsils are more common in individuals with carious teeth." He suggests further that one way of checking respiratory diseases will be by the prevention and correction of dental diseases, supplemented by the use of bland alcoholic solutions as mouth-washes.

At the risk of being considered tedious, I wish to state that practically the only real germicide which is effectual and yet not powerful enough to destroy soft tissues is alcohol. Most of the preparations which can be used in the mouth, as far as their germicidal qualities are concerned, owe their efficiency to the amounts of alcohol which they contain. The majority of the preparations on the market not containing alcohol are valuable as antiseptics rather than as germicides. All dentists, therefore, should use quantities of pure alcohol in disinfecting their hands and instruments.

But to return to our subject. The following case, still under observation, is interesting as demonstrating the relation between a disease of the mouth and severe gastritis:

Case I. Male, forty-five years of age, carpenter. History of persistent stomach trouble for two years, gradually growing worse. Losing weight, anemic. Unable to retain food in stomach for any length of time. Gave up

his work a few days ago to place himself under the care of Dr. A. H. Blocklinger of Dubuque, who called in the services of Dr. A. E. McEvoy, a dentist, and myself.

Without going into detail I will simply state that the patient had one of the worst cases of pyorrhea alveolaris which we had seen for some time. For two years, at least, pus from the mouth had been draining into the stomach, with the natural result of a severe gastric infection and general toxemia. Appropriate treatment shared in by the physician, dentist, and myself has already begun to result in improvement.

The following case I have taken from Ewald ("Diseases of the Stomach"). Note that the doctor, a stomach specialist, does not hesitate to attribute many of these diseases to the mouth:

Male, adult; typical mucous catarrh, artificial upper plate never removed at night; cleansed about every third day. The plate was covered with a dirty-white coating consisting of numerous fungi and masses of cocci, while the hard palate was markedly reddened and dotted with small aphthous ulcers. In the slimy stomach contents there were small brown streaks which consisted of granular blood pigment and numberless fungi and yeast-cells. The patient's complaints were relatively slight, and began only after treatment by the dentist. In this case the swallowed bacteria unquestionably kept up a constant state of irritation of the gastric mucous membrane.

The above, however, is not the only aspect of the subject. Leading surgeons in this country tell us that the actual danger of abdominal operations involving the intestines is increased in every case where there is the slightest chance of oral sepsis, while as eminent a medical authority as Dr. Osler writes that—"There is not any one single thing more important to the public in the whole range of hygiene than the hygiene of the mouth. If I were asked to say whether more physical deterioration was produced by alcohol or by defective teeth, I should unhesitatingly say defective teeth."

In concluding part II, it is necessary

to add that while my remarks have been more or less restricted to the relationship of the mouth to the gastro-intestinal and respiratory tracts, it must be remembered that quite a large number of mouth and throat affections may be local manifestations of a general disease—as for instance, as grouped by Stein (⁷), laryngeal tuberculosis in pulmonary tuberculosis, mucous patches in syphilis, perichondritis of the larynx in typhoid fever, coryza in measles, angina in scarlet fever, paralysis of the vocal cords in tabes, and pharyngitis sicca in diabetes mellitis. Stein also refers to the fact that the regional disturbances create or favor the introduction of other conditions—as, for instance, a foreign body resulting in pneumonia, rhinitis sometimes resulting in erysipelas, septal ridges in asthma, adenoids resulting in epileptic equivalents. It has also been noted many times that diseased tonsils may induce rheumatism (⁸).

(III.) INFLUENCE OF IMPERFECT NASAL RESPIRATION ON THE ORAL CAVITY.

Although we accept as a definition of respiration "the union of oxygen with the tissues," physiology teaches us that it is as essential for the inspired air to be prepared by the nose as it is for food to be prepared by the mouth before it enters the stomach. Besides the minor function of smell, the nose has the very important duties of (*a*) sifting the inspired air so as to render it free from dust, bacteria, etc., (*b*) regulating its temperature to nearly that of the body, (*c*) adding necessary moisture for its reception by the delicate lung tissue.

Dentists must recognize, especially in children, that all respiration should be nasal, that free nasal breathing will prevent many of the diseases of the respiratory tract, and that oral breathing is from necessity and not from choice. Writers have well said that "The human being is the only animal which becomes a mouth-breather." As a specialist, I honestly believe that nearly every case of mouth-breathing due to nasal obstruction can be greatly relieved if not actually

cured by proper attention. It is the duty of the dentist, therefore, to realize that his position as a public benefactor depends to a large extent not alone on his knowledge of the evils of dental caries, but also on his promptness in recognizing the ulterior results of impeded nasal respiration.

According to Spohn (¹⁰), "There are three classes of cases that breathe through the mouth, viz, those that have nasal obstruction and cannot breathe through the nose, those that have ample nasal space but lack in mental stimulus to the masseter muscles, and those that are imbecile." The last two types are of little importance to us and need not be considered.

Nasal obstruction is due to a number of very definite conditions, chief of which are septal deviations and spurs, hypertrophy and hyperplasia of the mucous membranes covering the turbinals and turbinate bones themselves, polypi, new-growths, adenoids, narrow constricted bony framework, and many other morbid changes. Nasal obstruction is especially harmful in children. In young infants it may be sufficient to cause death. Let me quote, on this point, an extract from Morse (¹¹), a well-known pediatrician, in regard to the effects of acute rhinitis or common cold in the head: "Owing to anatomical peculiarities a comparatively slight swelling of the nasal mucous membrane completely closes the nose and entirely prevents nasal respiration. This of course necessitates oral respiration, which the child performs very imperfectly, especially when asleep. In fact, sleep is so broken in many instances that the baby gets little rest and on this account loses strength rapidly. The occlusion of the nares also prevents proper sucking, and interferes a great deal with swallowing, even when the food is given with a spoon or dropper. As a result of insufficient supply of fresh air, lack of sleep and deprivation of food, feeble babies grow weaker and weaker and often die."

In adults it may be taken as an axiom that a dry mucous membrane will become diseased, and that imperfect nasal venti-

lation and interference with proper drainage will lead to further nasal obstruction and various catarrhal and accessory sinus troubles. It is also true that oral breathing is not so deep and long as nasal, hence the interchange of gases in the lungs is not as complete. The final result of less oxygen being used is often anemia. In children and young adults an incomplete interchange of gases may result in under-development of the body generally, maldevelopment of the bones of the face and jaws, and in a decrease of the resistance of the whole body to disease. The "adenoid facies" of the old writers is a good illustration of the evil effects of nasal obstruction. Anyone who has seen a child completely filled with adenoids and tonsils struggling for God's pure air gets some idea of the value of normally clear nasal passages. Orthodontists and rhinologists would be false to their training did they not devise ways and means to help these unfortunates. In this class of cases, especially, much good results from frequent and repeated consultations.

Other conditions not previously mentioned which are often found associated with oral breathing are hoarseness, headache, relaxation and thickening of the lips, mental indifference, spasm of the glottis, and croup. The limits of this paper hardly allow more than a passing notice of these last-mentioned conditions.

The following conclusions seem rational. I prefer in this to repeat a summary of Foster⁽¹²⁾ of New Bedford: "Imperfect nasal respiration causes partial or complete oral respiration, which through its influences tends to produce— (1) Indigestion. (2) Impoverished blood. (3) Lowered resistance, especially of the upper teeth and respiratory tract. (4) Deformities of the superior maxilla, with imperfect dentition both in quality and position."

(IV.) FAULTY ERUPTION OF THE TEETH AS A CAUSE OF NASAL SPURS AND DEVIATIONS OF THE SEPTUM.

In general the principal causes of deviations of the septum encountered by

the specialist are—(1) Trauma. (2) Asymmetry of growth.

As stated by Mosher⁽¹³⁾, "The tendency has been to make unequal development of the halves of the head the chief cause, overlooking the fact that while this is true in certain instances, more often the inequality of growth is confined to the bones making up the hard palate, *i.e.* superior maxillæ, palate bones, and premaxillæ. Irregular and delayed eruption of the teeth, and especially the incisor teeth, is the cause of this asymmetry in most cases."

In other words, as a large number of septal deviations seem to start anteriorly, it is evident that some force has been applied anteriorly sufficient to cause the deflection.

The same author continues: "Whenever there is moderate and equal delay in the eruption of the incisors, a double mesial spur exists at the floor of the nose on both sides, with little deviation of the septum. When, however, there is a marked inequality and delay in the eruption of one central incisor as compared with the other, a small spur is apt to exist on the side of the backward tooth."

Following this out, it is reasonable to suppose that similar conditions of the molars or posterior teeth might produce more or less deformity posteriorly. More knowledge, however, is needed to prove many of these points. Writers even yet are not quite sure as to the relation between cause and effect. Some would consider nasal stenosis as the cause of most of the deformities of the superior maxillæ, while others regard the variations in the jaws as the sole cause of the nasal changes.

As a matter of fact we need not give much time to the troublesome question of etiology in this paper. It is sufficient to remember that correction of irregularities of the deciduous set will secure better permanent teeth, and that proper breathing-space through the nose and throat aids directly in the development of normal dental arches and has a tremendous effect for good on all the bones of the face.

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PITFALLS IN DAILY DENTAL PRACTICE.

By FRANK W. SAGE, D.D.S., Cincinnati, Ohio.

(III.)

SPEAKING in general terms, one of the most dangerous pitfalls besetting the dentist is a too hasty jumping to conclusions; as, for instance, assuming that the patient already in your chair, for whom you are operating, is of more importance than another casually dropping in for an examination. Many dentists are so constituted that they are impatient of interruption. They become so interested in what they have imme-

diately in hand that they are incapable of easily detaching their attention from that particular operation, in order to answer the demand of someone coming in to consult them. It may be that the patient in the chair is anxious to catch a train, so that you, the operator, stimulated by a wish to get through in time, are rushing matters along at breakneck speed. The newcomer is therefore perhaps regarded as an interloper, to be got-

ten rid of as quickly as possible. The dentist glances hastily at his mouth, indicating, by manner if not by word, impatience at the interruption, putting him off with a suggestion of a later estimate of cost, if that be required; then he hurriedly pencils an engagement, and rushes back to his chair.

No matter how hurried a dentist really is, he owes it to himself to avoid showing impatience at interruptions of this kind. A word to the caller to indicate that he has only a moment or two to spare may be admissible, and is usually effective with reasonable people. Yet ladies—begging the pardon of the sex—are often slightly or not at all impressed with either the dentist's words or his manner, but will persist in telling to the minutest detail, how the tooth broke off, and when, and all about it, despite the dentist's obvious unwillingness to listen. With such inconsiderate bores—again begging pardon—the only effective course is to assume that far-off look which the dentist may assume without offense, for the reason that no patient would suspect it to be assumed for the occasion.

So, then, the dentist must smile and bow and look pleasant, even if he be in a hurry. The new patient may be worth far more financially to him than the one in the chair. Let her miss her train; ten to one she came half an hour late in the first place. You can always explain that you would surely have made a poor filling if you had not made her miss her train. Patients easily get over that sort of a "mad," at all events.

Many a dentist, through his tumultuous anxiety to save a patient a half-hour's wait for another train, has fatally discouraged another patient waiting with a hundred-dollar fee, while he was pre-occupied with earning a five-dollar one. A bird in the hand may be worth two in the bush, but not as much as one of more brilliant plumage already in the trap.

Another pitfall of one's own digging, another evil result of impatience, in short, another blind jump to conclusions,

is often made by a too hasty estimate of the cost of operations. How often do we need to remind ourselves that nothing is more liable to deceive than a decayed area in a tooth. A hasty glance, a partial exploration of cavities, and an estimate given to the inquiring patient; then the first sitting, and the discovery that apparently simple cavities have developed into compound ones, that superficial stains mask sinuous areas of decay girdling the necks of teeth, while exposed pulps lurk in the bottoms of cavities which we took to be hardly more than abrasions. If the dentist happens to be one of the ludicrously unhappy class who leaves all cavities suspected of being difficult until the last, he may fill three or four teeth before discovering the snare which he has wound about himself.

At this stage some dentists have the moral courage to tell the patient that their estimate was too small, risking his going away without paying for what has been done. Some, however, go on to the bitter end, pocket the inadequate fee without a word of protest, never reflecting that they have probably for all time barred themselves from the privilege of charging that patient an adequate fee. Thus do dentists lay the foundation of an unprofitable practice.

Another pitfall is the too easy compliance with almost any terms of payment which the patient may suggest. Often the dentist who does not possess an extended knowledge of human nature will be impressed with what seems to him the spirit of honest fairness in a patient's saying, "I cannot pay you all at present, doctor. I will pay you a part and should like to pay the balance in monthly instalments." (Then he pays a dollar on account, and demands a receipt.) People who mean all that they say will submit a proposition in such terms, and will keep their promises. Others will assume this plausible air of sincerity with the purpose of deceiving. In suspected cases it is a good plan to promptly reject the suggestion, substituting another, such as this, "We are comparative strangers,

you no doubt have friends who would gladly lend you the money. Then you can pay it all in a lump, saving yourself a number of trips to my office."

Such a suggestion, indicating that you wish to know all about the source of your pay, and what assurance you have of your getting it at all, will often give you a clew as to the patient's real design. Every town and city is swarming with people who will trick a dentist if they can. Therefore the dentist must in self-defence require to know the terms of payment which the patient has privately in mind. There should be far more requirement of retaining-fees on the part of dentists than is at present customary.

It will be seen that in all this more attention is paid to the personal welfare of the dentist, and less to what seems to be an unwritten precept, demanding that the dentist should devote himself to the best interests of the patient, and leave personal interests out of view. This is a thing very few dentists actually do. The sentiment is absurd, unworthy, chimerical, and should be relegated to the limbo of a lot of out-of-date ideas respecting dentistry. What every young dentist wants, and has a right to expect, is a lucrative practice. What he only too often gets is a sort of half-and-half practice, the one half being worth while, the other not. One respect in which he needs to educate the public from the very start is an understanding that dentistry is something the payment for which the patient must prepare himself in advance, even if somebody else has to wait. How often do we hear a patient explain that he fell ill, and had a doctor's bill to pay, as an excuse for not having paid to his dentist a still older bill!

I believe it to be a good plan, when a patient who cannot pay applies to us, to give the teeth enough attention to save them for the present, collect a nominal fee, if possible, and inform him

that he must scratch around and secure the money before you will undertake to do permanent work. Limit the time at that. Give him six months or a year, but limit the time. By so doing you impress him with the idea that you are not town property. I believe it to be wise to frankly inform begging patients that you find it to be in your interest, dentistry being at best a very trying profession, to confine your services to the class who can pay and to rest between times. That "puts it up to them" either to get into the paying class or to let you alone. It seldom fails to produce a salutary effect. Too many assume that dentists are only too glad to get something, anything, to do.

I am impelled to write thus regarding the material interests of young dentists by letters which I have frequently received from them, from cities, towns, and villages, east and west. A young man wrote recently from a city of 14,000 inhabitants, as follows, "There are more people to the square acre in this town who cannot scrape together four dollars at one time than in any other city in the United States."

Many dentists draw just such conclusions from a superficial view of conditions. Money does not grow on bushes anywhere. No doubt this dentist drew his conclusion from looking over his unpaid accounts. The probabilities are that he has not expected enough, has not demanded enough. Probably money has circulated all around him without hitting him. Ten to one it is his own fault.

In a book of statistics as to trades and professions in New York city, the average income of resident dentists is put at \$1000. Policemen also average \$1000 annual pay. The policeman requires no office, no office-girl, and he probably pays only one rent.

The dentist may practice a lifetime in a town and never own a foot of ground or a home. It is a terrible mistake for the beginner to so love peace and quiet,

and keeping on friendly terms with everybody, that he shrinks from battling for his rights and his family's rights. It is bitterness enough to find oneself

outstripped by many who are no more deserving than the faithful dentist; far more bitter it is to have to admit failure in the end because of mismanagement.

CORRESPONDENCE.

THE D.D.S. IN ITALY.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—There is a movement in Italy among the medical doctors practicing dentistry to have legalized an order promulgated in 1890 by Minister of Public Instruction Boselli, prescribing that *only M.D.'s may practice dentistry in Italy*.

If such order—which has not been enforced heretofore—is made a law, the American D.D.S. cannot legally practice in Italy.

Italy has no dental school at present. In the universities only a little theoretical instruction is given regarding the diseases of the teeth. Graduates who wish to become skilled dentists have to go to a foreign country for instruction.

The American dentist is considered the best in the world. Here there are two separate schools, one for the M.D. and one for the D.D.S. Here any professional man, from whatever country he may come, is allowed to practice after passing the state board examinations.

Why, then, should not an American D.D.S. enjoy the same privileges that his own country affords to others?

I believe that if such law were passed it will be a great injustice to the graduates of this country, as they are entitled to recognition for the reason that the American D.D.S. is a professional creation not existing in Italy, and that he knows as much of the dental science and art, if not more, than any M.D. practicing dentistry there. Taking into consideration this fact, and also the matter of reciprocity, this country ought to make, through its ambassador at Rome, some representation to the ministry, so that the Chamber of Deputies in passing that law might accord to the American graduate in dentistry the same privileges that the American laws accord to foreign graduates here.

Yours very respectfully,

G. M. DE VECCHIS, D.D.S.

PHILADELPHIA, April 14, 1909.

PROCEEDINGS OF SOCIETIES.

NEW YORK ODONTOLOGICAL SOCIETY.

Monthly Meeting, January 1909.

THE forty-second anniversary meeting of the New York Odontological Society was held on Tuesday evening, January 19, 1909, at the Academy of Medicine, No. 17 West Forty-third street, New York city.

The president, Dr. W. D. Tracy, occupied the chair, and called the meeting to order.

Dr. C. N. JOHNSON of Chicago read the paper of the evening, which was entitled "A Plea for Rationalism in Modern Methods of Practice."

[This paper is printed in full at page 689 of the present issue of the COSMOS.]

Discussion.

Dr. S. G. PERRY. I do not recall any paper that was read before this society in recent years that was more conclusive and less discussable than this. From the standpoint of my own experience, I consider the writer to be on firm ground in every sentence which he has written.

It is Emersonian in its short sentences and therefore, I think, a model in its literary style. But of greater value is its conservative balance and its sense of just proportion. It could not have been written by any young man nor by many old ones. If the writer were a lawyer I should say he had the judicial temperament. His paper is the outcome of long experience and close observation, and is the embodiment of high ideals in the matter of work, and even higher ideals in the matter of the obligations of the dental practitioner.

There must have been some ancestral

strain that gave the writer a level head, and the level head is needed in our profession today. It is needed in all of our modern activities. In our industrial, commercial, and financial life we have been nearly wrecked by the strenuous knocking down of the old and the attempted setting up of the new. In our national life we are reckless of the traditions and of the restraint of the past, and insane in the license of the present.

In our profession, as in public life, we need a Taft to bring us to our senses, and to restore the just balance so necessary to enduring progress. If this seems far-fetched I predict that it will not seem so a quarter of a century hence, when seen in perspective.

Perspective is a fanning mill that blows away the chaff and leaves the clear grain. Gold fillings forty years old, that look as if they would last forty more, are not to be sneezed at. I know of one gold inlay that was sneezed out after being in a month. I have recently seen a tooth that was nearly cut to pieces to receive a porcelain inlay, and that inlay was swallowed the next day.

Of course you will say that such things would not occur in the hands of a careful operator. That may be true, but you must remember that there are many members of our profession who are not careful operators, and that they take their cue from those who are. Therefore it behooves you to restrain your enthusiasm, and to stand inflexibly for only that which time has proved to be worth standing for.

It seems to me that this is the valu-

able lesson taught by this paper. The writer has offered an unanswerable argument in favor of reasonable conservatism. This is shown when he says "Let us strive for mental balance in our progress, and then that progress will be more secure." That is the text that every young man should post conspicuously, and should regard as the Bible of his professional life.

The fault of the paper is that it is too short. I wish the writer had gone further, and specified examples in proof of the truth of his contention. There are wrecks enough by the wayside that he could have cited with graphic effect. On the other hand, there are beautiful temples at every turn to illustrate the enduring achievements of our profession. And then there is a long array of minor things that I should place in the borderland between the two extremes, and that sometimes seem to belong on one side, and sometimes on the other. I am tempted to name some of these, frankly admitting where I stand in reference to them.

To be on both sides of a question will keep one near the happy mean, and I agree entirely with the writer in his glad acceptance of the porcelain and gold inlay, and his loyal allegiance to the gold foil filling. I believe there is a happy compromise between the two, that is being lost sight of in the wild enthusiasm for the newer method. I refer to the perfectly made amalgam filling.

There was a time in the early days of my practice when, though I felt much the same as I do now, I should not have had the moral courage to say what I am now thankful for having the opportunity to say.

Passing by the advantages of the porcelain and gold inlays and alluding only to the weakness of each, I would say that the porcelain inlay is brittle, has a hopelessly intractable edge, and requires the opening of all cavities, and the consequent cruel cutting of the teeth. The gold inlay compels the same cutting. Both have the same inherent weakness, which is, since cavities must be cut so

that inlays can be put in, that they are so cut that the inlays can come out.

No structure can be stronger than its weakest part, and the cement is the weakest part of any inlay operation.

I am an enthusiastic advocate of the porcelain and gold inlay under certain conditions, but the severe cutting and the weakness of the cement make the thorn that spoils the rose for me. It is often literally a thorn in the flesh. Therefore I still cling in a measure to the gold filling that was the ideal filling a quarter of a century ago.

If Grecian sculpture reached its perfect development under the hands of Phidias, so contour gold fillings reached perfection under the firm hands of Varney. Would anyone today venture to decry that great masterpiece, the Venus of Milo? And who would have the courage to say that better fillings have ever been made than those beautiful contour gold foil fillings made by Varney thirty-five years ago?

Thirty-five years is a long time for the life of a filling under such dangerous and exacting conditions as exist in the human mouth. Yet I have seen a great many such fillings made by other men than Varney that are as good today as they were when made twenty-five or thirty years ago.

I presume we have all seen many porcelain and gold inlays that have not lasted two years. Then what shall we do in those cavities where we shrink from cutting the teeth enough to insert any kind of an inlay in cavities that are so large that we dread to undertake the task of filling them with gold foil?

If cavities are situated in the back of the mouth, where the work will not show, I fill them in the most careful manner with the Standard alloy. By doing this in the most painstaking way I feel that I have done the very best that is known today. I dislike to use amalgam, but I have seen too many alloy fillings that are rendering good service after thirty, forty, and fifty years not to have respect for it as a means for saving teeth.

If this can be said of alloys that were

made before the art of combining their ingredients was understood, what may not be hoped from them now that the laws controlling them are known! There may be other alloys as good as the Standard, but if so I have never seen them. I am compelled to single out this alloy for mention, because my contention for this mode of practice rests on the use of an alloy that has good edge strength and that stays exactly where it has been placed.

Just here I wish you to understand me. I am not advocating the use of amalgam as it is ordinarily used, nor the use of any amalgam except that named, which is made by Eckfeldt & DuBois, and was brought out nearly thirty years ago, being formerly sold for ten dollars per ounce. It is sold now at six dollars per ounce, and its high price has doubtless kept it from being generally known and used.

If this amalgam is not available, better results might be obtained with the gold foil filling or the gold inlay. But with that amalgam less cutting is required, time is saved, the strain on the patient and operator is avoided, and what is of the utmost importance, its plastic property enables one to give any desired shape to the filling, so that contours are easily restored.

About thirty-five years ago, I contended with all my energy for the preservation of the natural shapes of the teeth. From that day to this I have grown stronger in my faith in that practice. I did not then anticipate the coming of a Fletcher, but I felt somehow that the development of the human teeth, whether through eons of selective affinities, through approval and survival of the fittest, or by the molding of intelligent impulse, is the expression of a law that is so perfect and so beautiful that it should be sacred, and that in our operations on the teeth we should as far as possible preserve their shapes. In doing this, an amalgam filling is like clay in the hands of the sculptor, and this practically places it in the front rank as a filling material.

I said that I do not like to use amal-

gam. This is true only because of its color. Aside from that, it is a delight to see the outlines of a decayed and broken tooth gradually restored by the use of dainty molding instruments, and when such a filling is well anchored it is a comfort to know that it cannot come out.

I do not expect to be supported in my contention that amalgam is a first class filling material, but, as I said before, please note that I do not allude to amalgams as they are ordinarily made and used. I have in mind a preparation of cavities as thorough as for the most difficult gold foil fillings, and as careful a finishing at a subsequent sitting. Unfortunately, the color of amalgam in most cases must limit its use to the posterior teeth.

I take advantage of this opportunity, and go out of my way to make this earnest plea for this particular filling, because I have observed that, as might have been expected, many enthusiastic operators are ruthlessly cutting the teeth for the use of the porcelain or gold inlays, the merits of which I think are not yet really known.

Please do not forget that for this amalgam cavities need not be cut nearly so much as even for gold foil fillings. On approximal surfaces, with delicate and ingeniously shaped instruments many cavities can be preserved without cutting through to the occluding surfaces, as would be necessary in making gold foil fillings. This may be of little moment to those who do not marvel at the beauty of a set of teeth, and who do not feel that each tooth is a part of an harmonious whole, and worthy of being preserved as nature made it.

I would not make this contention for this alloy if I did not believe that it maintains a good edge and stays exactly where it has been placed. If this is true, then in the posterior teeth, at least, the porcelain and gold inlay is not a necessity. In the hands of an inaccurate operator, who might use the ordinary amalgams, doubtless the gold inlay is of distinct advantage, because it more nearly eliminates the personal equation. It is

also of great advantage for the patient who hates the sight of a dark filling or of a discolored tooth, and for the accurate operator who delights to work with gold.

Please do not consider that I do not welcome the porcelain and the gold inlays. I think that they have both come to stay, and their advent will help to elevate the average of dental operations. I am only contending for the moderate conservatism that is such a striking characteristic of this very wise paper.

This paper is broad and general in its character. I wish the writer had allowed himself more liberty and had gone more into detail. I wish he had spoken of the value of gutta-percha in young teeth, and of its help in preparing cavities for more permanent work; of the value of tin foil in the tiny fissures of children's teeth, where its soft quality allows of wedging it to a tighter fit through the force of mastication, and of the possible advantages of the silicate cements. His avoidance of allusion to the latter might be taken as an evidence of the inherent conservatism of his mental processes, because it may well be said that no one can yet tell what the final place of these fillings will be.

The speaker did not mention implantation, which still has some value to the discerning; or pulp-capping, which in Atkinson's time was common, and which is practiced now only by the young or the brave; or sterilization, which is the one fad that will probably never have doubters or enemies. The history of these minor items supplies proof of the truth of his contention, since they have been tried and, except pulp-capping, have not been found wanting.

Lest I be misunderstood in clinging somewhat to the gold foil fillings, and to the use of amalgam in some large operations, let me again say that I welcome in the most cordial way both the porcelain and gold inlays. From the very first I have used them both, with an increasing appreciation of their value. Every day of my life I am thankful that I have lived long enough to see their advent, and to believe that they are destined to be

accepted as being of great value to our profession.

I honor Dr. Jenkins for all that he has done to perfect the porcelain inlay, and I am profoundly grateful to Dr. Taggart for an invention that marks the beginning of a new epoch in our profession.

My only fear is the radical practice of those hopeful men who see in every innovation a reason for giving up those that are old and well tried. Of course such men are necessary for our progress, for without them we should still run along in the old groove.

Doubtless you will say that I am on both sides of the fence. I frankly say that I am. From the very nature of my mental processes, which I cannot control, I have to be. This opens me to the charge of cowardice. I am a coward as far as my patients are concerned, but I am not afraid of shaping my professional life in accordance with the reasonable conservatism contained in this valuable paper.

I cannot close this discussion without alluding to a subject that has not been mentioned in the paper, though it is one that in my judgment pre-eminently calls for the conservative treatment so characteristic of the writer. I refer to orthodontia.

It seems to me that a mention of the recent developments of orthodontia might have been expected. After becoming accomplished in the art of saving teeth, it is only natural for men to desire to see them placed normally in the human mouth. It is entirely creditable to their esthetic sense, to their desire for the good of their patients, and to their just pride in a work that is truly scientific.

But here again, as in the other branches of practice, the danger of extreme radicalism presents itself, and in my opinion many teeth are being regulated today that if left to the divine orthodontist would in due time fall into line. But this is too large a subject for this occasion, and I must close with a repetition of good words for this valuable paper.

Dr. A. L. SWIFT. In continuing the discussion of this able and intensely prac-

tical paper, I cannot disagree with the essayist on a single point. His arguments are built upon the solid foundation of those tried and proved methods of practice which have stood the test of years, and are therefore most convincing.

In this age of progress of our profession "A Plea for Rationalism in Methods of Practice" is most timely, and the doctrine of conservatism, not ultra-conservatism, should be a part of the creed of every conscientious and scientific practitioner. Enthusiasm is essential to progress, but the essayist aptly points out to us the danger of permitting it to carry one "beyond the bounds of sane and sober reason." His reference to the "porcelain wave," and the enthusiasm which predicted the relegation of the gold pluggers to the junk heap, should convey a warning of equal significance to the gold inlay enthusiast, who has already practically abandoned the use of gold foil even in small and medium sized cavities which are easy of access, and which I thoroughly agree with the essayist "could be filled more expeditiously and with much better judgment with gold foil."

Those who use the impression method in the construction of gold inlays tell us how easily and quickly they prepare large numbers of such cavities in one day, and take impressions and bites, which are passed over to their laboratory assistant, whom they keep busy turning out finished inlays ready for setting and finishing. They are most enthusiastic over their results; say that they have little use for their pluggers, and claim a great saving of time and nervous energy, and a much larger remuneration for the gold inlay than for the foil filling. Work made easy, income substantially increased—a consummation devoutly to be wished, provided that the final and permanent results are equivalent, otherwise the principles are worthy only of emphatic condemnation.

As we cannot yet claim the establishment of permanence of the cast gold inlay, would it not be better to be more conservative?

The test of time having conclusively proved the value of gold foil in selected

cases, when properly manipulated, would it not be safer to employ that which we *know* in the class of cases referred to? I firmly believe the cast gold inlay and the porcelain inlay have a most important field of usefulness in our practice, but I am convinced that there is room for sound judgment in the selection of the cases. There is also a necessity for exact technique, which can only be acquired by experience. I do not expect to discard the use of my gold pluggers very soon.

Rationalism in the treatment of the dental pulp is another subject well worthy of a plea for conservatism. This is a subject in which I am deeply interested, and I regret that time will not permit my dwelling upon it, but I wish to go on record as entering a decided protest against the ruthless and wholesale destruction of the pulp as it is so generally practiced.

I cannot close my remarks without referring to the note of conservatism suggested by Dr. Perry in reference to orthodontia. Many young practitioners who have been out of school but a few years go to the schools of orthodontia, take a short course, and immediately establish themselves as specialists in orthodontia, without having long experience and that conservatism which only long experience can give. I think that our younger specialists in orthodontia should take well to mind that note of warning as to conservative practice.

Dr. NYMAN, Chicago. It is a source of great satisfaction to me to have had this paper presented by this man at this time and place. It is timely and is a classic; full of logic and facts, and some of the advice which Dr. Johnson gives us is couched in such epigrammatic convincing language that I think it would be well for many of us to have extracts of this paper copied and framed and hung up in our little sanctum sanctorum, so that when we grow tired we can step in there and have our backbone restored. We shall be better able to serve our patients and to do justice to the calling which is our life-work.

I thoroughly agree with the essayist

that the gold inlay does not displace the other methods of practice in the repair of teeth. There has always been a strong note of conservatism in all of Dr. Johnson's work, in his writings and in his conversation. It was due to him that some years ago I read a paper before the Illinois State Dental Society, which had for its title "Conditions and Circumstances Modifying Extension for Prevention," and which was written immediately following the publication of Dr. Ottolengui's article on the question of extension for prevention, together with the published views of a number of operators of the East and West.

The idea of conservatism also found reflection in the views which I expressed here some four or five years ago in a paper on porcelain, in which I endeavored to condemn with all the force that was in me the dogmatic statements that pluggers were things of the past. Some of the gentlemen present may recall some of the arguments which I then tried to present. While trying to induce you to take up the new work, I endeavored to caution you unmistakably not to abandon that which was good in the old. The dental profession seems occasionally to go through a psychological convulsion. They seem to drop on their knees and worship some new god, giving thanks in their fervor that at last the dream of the ages has come true, only to find out later that their god is a god with feet of clay and with an empty head.

I believe that the value of the gold inlay has been established without peradventure of a doubt in that class of cavities in which it should be used. There are records of gold inlays which were made according to indifferent and unscientific methods ten and twenty years ago, and which are still preserving teeth.

Since Dr. Perry has spoken of an inlay which was sneezed out a short time after it was inserted, let me tell you of a magnificent gold filling that came out exactly one minute and forty seconds after it was put in. It was put in by one of the best operators in Chicago, and it happened to be in my own tooth! It fell out while it was being polished with disks.

So these are not conclusive arguments one way or the other.

There are cavities to which the chiseling away of the frail enamel walls imparts a natural retentive shape, so that very little cutting of any kind is required for the proper retention of a gold filling; but it would require extensive cutting to insert a gold inlay or any other inlay. Under those circumstances I do not believe that we are justified in putting in an inlay. I find many large compound cavities with some peculiar extension of caries. To prepare such cavities for a gold inlay would require so much cutting that it would simply make me look aghast at an operator who would do it; but when I can solve the problem nicely for the patient and myself by cleaning out the caries in the little odd extension, filling it temporarily, and later removing the cement and inserting a small gold filling alongside of my inlay, I combine the two.

In those extensive operations that mean hours and hours of inserting gold foil and large fractions of hours of polishing, I believe the modern gold inlay is better for the tooth than the finest gold filling, because the fact that the tooth must be kept so profoundly dry for such a long time exerts a very deleterious effect on both dentin and enamel. In such a tooth an injury occurred which perhaps was not apparent at the time, nor immediately afterward, but it manifested itself some time later, when to the dismay of the operator and to the consternation of the patient a whole section of enamel and dentin broke off. There is a flow to gold foil, and even to gold in combination with platinum. Under the incessant stress of mastication the gold foil spreads, and if the force should be exerted at a certain angle, within a short time the buccal or lingual wall will be broken off.

With the gold inlay we avoid in the first place this excessive dryness. In the second place, we avoid weakening the side walls, and in the third place, we avoid ultimate thermal shock, because we have the interposition of the layer of cement, which acts as an insulation against heat.

I place my reliance on such a retention, which by its mechanical nature safeguards the inlay against the stress of mastication, so that it could not be dislodged by the force of mastication even if there were no cement there. I never pretend to depend upon the adhesiveness of the cement. Truly, the adhesiveness of the cement does retain the inlay against the force of gravity as exerted by its own weight or the force that might be developed by suction, but aside from that, I do not believe that cement should ever be relied upon to hold in an inlay.

If you will prepare a cavity correctly, and follow conscientiously all the steps of the cast gold inlay process, you will produce an inlay which can scarcely be distinguished from a filling. I have examined gold inlays made by the hands of the most capable operators under strong hand magnifying glasses, and although these inlays were set with a cement which did not correspond with the gold inlay or the tooth-structure, the operator had so carefully burnished the gold over the margin that he practically covered up the cement line, and produced an inlay that will probably never show any signs of dissolution on the margin.

Many of the old operators decry gold inlays, because they say it is no art to make a wax model of a filling, and reproduce it outside of the mouth. Instead of it being no art at all to make a wax model for a cavity, I think it is the most delicate of any of the steps of the gold inlay method, the most difficult part of the whole gold inlay operation.

We do not employ the gold inlay method because it is an easier operation. Provided the form of a cavity is favorable, it is the most humane method of any that can be developed. It is far easier for many operators to cut away the tooth-structure with wheel and bur and disk, than it is to properly condense and finish gold foil, and I am sorry to confess that I have watched many men work feeling that their predominating motive for deciding what they were to do in that cavity was their desire to perform the easiest operation, and their conviction that they could put in an inlay bet-

ter than they could pack in and finish foil.

As far as porcelain inlays are concerned, it has been my experience that they are no longer to be regarded as a permanent practical repair of the teeth. They are only to be used in those cases in which the esthetic phase is the predominant factor. You cannot construct or set a porcelain inlay that will ever begin to be such a permanent protection to a tooth as a gold inlay is, because of the fact that it is impossible to prepare the margins of the inlay and of the cavity in such a way that their preparation guarantees permanent results. I have come to regard the porcelain inlay as the most prominent of the esthetic measures for repairing teeth that occupy a conspicuous position in the mouth. I feel that in a cavity in which cement would last for a year or two, we may expect a porcelain inlay to be retained for from three to five years, and I am cautioning all my patients now that they must keep a very careful watch on any porcelain inlays in their mouths that have been in for more than two or three years, because in the natural order of things they may drop out. This is my conviction gained by experience and thought on this subject.

Dr. GORDON WHITE, Nashville, Tenn. I do not think it quite fair to be called upon to discuss this most excellent paper of Dr. Johnson after such men as Dr. Perry and others, who have seen it and have prepared their remarks.

Conservatism should ever be in our minds, but extremes have their place in life and in the professions as well. It does me a great deal of good at times to see the work of extremists, because we can profit by their mistakes as well as by their new ideas, and develop from them; for we must recognize the fact that some of the most useful innovations have come from extremists.

Recently I had a patient in my office who had come from a distance whose mouth showed the operations of an extremist, who was certainly an enthusiast, for he had placed in this mouth gold cast inlays in every tooth back of the canines.

In many instances great care should be exercised in this operation. When the decay is extensive and it is necessary to cut the tooth considerably, particularly if the occluding surface is covered with the inlay, and the pulp is vital, this pulp may die after a while, and it is no easy matter to penetrate through large inlays into the pulp-chambers of teeth which possibly were filled by some other practitioner. When the tooth is greatly decayed and there is any question as to the condition of the pulp, I consider it wise to remove the pulp before inserting a very large inlay. It will save yourself as well as any other practitioner who may get your patient much trouble.

Inlays are not new, but as far as I know, wax models and cast gold inlays are. These represent the greatest step forward which the dental profession has made in many years, and the field for its application is almost unlimited. I for one am very grateful for its introduction.

Dr. WATKINS, New Jersey. I cannot resist the invitation to simply say a word of thanks to Dr. Johnson for his admirable paper. I do not know when I have heard a paper which I enjoyed so much. To every word of it, right through, I can say amen. It is practical, everyday common sense.

Dr. DAILEY. It seems strange that so much conservatism should be congregated here tonight. If we stop and look back about two years, we recall that one of the most wonderful discoveries was placed before us in this hall. Conservatism is the ideal which so many men are preaching, and which many are practicing, but there is a vast difference between conservatism, radicalism, and conscientiousness. The men that are being accused of radicalism call themselves conservative, because they lay their claim upon scientific principles.

May I call attention to the fact that from the city from which our estimable essayist comes come also Dr. Black and Dr. Taggart? What do they say about conservatism? Go back to what Dr. Black has said, that no frail enamel should be left in the cavity, but sound

dentin, without which failure is inevitable.

Rationalism and conservatism in cavity preparation, based upon Dr. Black's investigations, is not a hearsay, but a scientific fact.

In regard to destroying tooth-structure, Dr. Black says that rationalism is placing a perfect gold filling in a properly prepared tooth. With the so-called conservatism, what remains? Frail enamel, frail everything, the whole continuity is frail.

Some time ago I had the temerity to advance the subject of orthodontia in young children, because in the period between the third and seventh years the greatest development takes place in the mouth. Some wait until the twelfth or fourteenth year, because they believe in conservatism. If you wait five or six years in curvature of the spine, would you benefit the patient? If that is so, then why should you wait in the case of non-development of the jaw? Follow men like Dr. Black, and not men who constantly plead conservatism.

Dr. MILLS. I wish to pay my regards to Dr. Johnson. I know something of him from corresponding with him, and from reading his papers. The spirit of his paper of this evening is just, and the discussion is a credit to the men who participated in it. I am sitting beside the venerable father of our president, Dr. Tracy, whom I knew in 1852. In 1852 I went to Worcester, my native city, with a *confrère* of Dr. Tracy—Dr. Jencks my preceptor. If I could take you back and show you what has happened in these fifty-seven years, you would be interested. The age has changed, but there has been a conservative element all along. You could not fill teeth then as you do now, but I saw fillings from the hands of this venerable man that cannot be excelled. I do not wish to intimate that we have not made immense advances; we have most skilful operators today, but conservatism is necessary.

I came to New York in 1861, where I met the Atkinson element and entered into it largely. I had my failures and successes, but it led me into conservatism

to a large degree, and I agree with Dr. Perry. I cannot help but think of the late Dr. Woolworth of New Haven. He was at one time a most skilful gold operator. When addressing meetings he would say, "I cannot put in as good gold fillings as I used to, but I can put in pretty good amalgam ones."

When I first practiced, we had gold and Bevan's stopping. We have gone all through the various filling methods up to the present time. When Dr. Taggart was here and introduced his beautiful manifestation of mechanism, I felt intuitively that that man had hit upon a line of practice that would be of immense value to the profession, and it cannot be otherwise.

This is the thought that comes to me: Dentistry is individualism. What some men can do, as Dr. Black shows so beautifully, other men cannot do. It is the man behind the instrument that determines its efficiency. I could not take up the Black practice, even if I were young enough to do it; but I know a method that I could take up and be successful with.

I admire the spirit of enthusiasm and also that of conservatism. Both are valuable, if we but properly apply them.

Dr. OTTOLENGUI. This whole evening has depressed me very much. It has depressed me to hear men whom I love so much say things which were never less opportune. There never was a time in the history of dentistry, in my opinion, when an appeal for conservatism as it has been presented tonight could possibly do more harm than now. The essayist built up the steps of his argument very well on a lot of fads which the dental profession ran wild over, and whose uselessness has been proved. That does not bring us to the logical deduction that the particular fad which inspired this paper is one of that class.

I want you to think over what the other gentlemen, the skilled practitioners who have spoken, have said tonight, and let me give you just this thought: It is natural, it is human, that we should believe in the things which we have done. The gold inlay has the disadvantage that

it is being practiced now by graduates who were taught other methods. All of the comments against gold inlays that I have heard tonight prove to me conclusively that what this audience needs more than anything else at present is postgraduate education on the technique of making gold inlays. [Applause.] Not one of the real virtues of the gold inlay has been credited to it this evening. All of the objections have been mentioned, and those objections, though true, are due mainly to the inexperience of the operators and to their lack of knowledge of how to make inlays. Many have taken up this "fad" thinking it to be an easy way. It is not easy; the best way never is an easy way. The best and right way means putting into your work all of your conscience and skill without any consideration of yourself. The man who takes up gold inlay work because he thinks he can make more money or render the work easier for himself is not fit to practice dentistry. [Applause.]

It takes me longer to prepare a cavity for a gold inlay than one for any other kind of filling, and that has disproved to me many of the arguments against extension for prevention in which I formerly believed. It has proved to me that frequently I had not properly prepared cavities. This much have I learned within a year.

You speak of gold inlays that have stayed in, and fillings that have come out. I defy anyone to show gold fillings one year old that will begin to compare with equally well made gold inlays one year old. Dr. Nyman said that he has seen gold inlays that experts could not distinguish from the best gold fillings. He is mistaken; the inlays can be detected at once, they are so superior.

Dr. NYMAN. I meant directly after they were finished, not after service.

Dr. OTTOLENGUI. They have occlusal surfaces that few gold fillings ever have had. The main thing is—and I remind those of you who were here on the night when I discussed Dr. Taggart's paper, of the one prophecy I made, which has come true—the gold inlay means painless dentistry.

Dr. JOHNSON. Not by any means.

Dr. OTTOLENGUI. I assure you that the gold inlay properly put in will cause less pain than the filling of the same tooth with gold. I may not have used the right term, I meant to say, less painful dentistry.

It has been possible for the first time to make an absolutely perfect margin extending under the gum and to polish it outside of the mouth without getting any blood from the gum upon it, and I defy anyone to put in gold fillings and get as perfect gingival margins with them under the gum as can be obtained with gold inlays. The plea for gold foil fillings which was made tonight brings me back to the statement of Dr. Flagg, which is proved today, namely, that just in proportion as a tooth needs saving, the gold foil filling is least capable of doing it.

The reason why I felt depressed tonight is this: What does the profession need more than anything else at present? Not arguments for and against the gold inlay, but proper teaching in the schools of how to put in a gold inlay; yet we have had two professors speak against it tonight.

Dr. NYMAN. And the class of cavities for which they are best adapted!

Dr. OTTOLENGUI. Absolutely so. One of the speakers said that he was sorry for the ruthless destruction of pulps. I am sorry for the ruthless leaving in of pulps that ought to be taken out. It is strange how an idea sung over and over again after a while is accepted as a truth. Ever since I was a little boy I have heard that thermal shock will kill a pulp, yet it has never once been proved. In my opinion—though I cannot prove it—it never has been thermal shock that killed pulps, but infected material that was left in the tooth. The infected pulp was doomed to die when the dentist filled the tooth. [Applause.]

Besides, thermal shock is not necessary if the gold inlay is properly constructed. So I end where I began—it is not your conservatism in this crisis that will be helpful, but the radicalism of the

man who knows how and is willing to teach the other man.

Dr. EVANS. I did not come here with the slightest idea of speaking, but when I hear remarks such as Dr. Ottolengui uttered I feel it is my duty as an old practitioner, and as a man who has been proud of American dentistry in the past, to speak a word. I did not hear the paper, but I heard the remark that if you take gold fillings and gold inlays and view them a year after they were inserted, you will find the gold inlay to be in a very superior condition to that of the gold filling. I take a decided exception to that. What did we build up American dentistry on? On our operators. Do we honor Webb and Varney and Dwinelle and our respected Atkinson when we pass a reflection on their work by such a statement as that? I say the man who knows how to handle gold foil and to preserve teeth in the way he should, and to manipulate gold foil on the adhesive principle, small pieces being properly welded down, can make a gold filling that will look at the end of one year the equal of any gold inlay, and there are men here this evening that can do it.

Dr. OTTOLENGUI. Nobody reveres Webb and Varney more than I do, for I learned much from them, but I venture to say that if they were here tonight they would be praising gold inlays instead of gold fillings.

Dr. EVANS. I accept the gold inlay in such large cavities as Varney and Webb used up their vitality on and put themselves in an early grave for; but in smaller cavities, especially in the front teeth, where a sufficient amount of the labial section of the enamel can be properly preserved, the gold filling is the filling to be put in, and not the inlay.

Dr. VAN WOERT. I hardly know what to say, I feel so deeply the value of the paper of this evening, and yet I am one of the oarsmen in the boat with Dr. Ottolengui. I cannot but feel that a cemented filling, particularly the gold inlay, comes nearer to the ideal of the average practitioner than anything else known at the present time. I discarded gold plug-

gers and gold foil over five years ago. I do not think that in those five years I have inserted two gold foil fillings, and in that time I have not had anything like the percentage of failures that I had prior to the adoption of this more modern method. That is not to say that my previous operations were all so faulty that they could not be relied upon. I have known many operators such as you have cited this evening, among them Webb. I sat beside him and saw him insert two fillings in the central incisors for our dear friend Dr. Hill, and I never saw more beautiful fillings. I never saw a gold inlay more beautifully finished or margins that were more perfect, and yet, gentlemen, Webb's fillings did not last one year. If such a man as Webb failed, I am justified in having failures too; but the number of the failures that I have had since adopting the cemented filling is far below that which I experienced before. Therefore I am justified in accepting this modern practice, because I surely could not serve the people who come to me as well in the old way as I can in the new.

Dr. Perry said that a carefully inserted amalgam filling in a carefully prepared cavity is just as serviceable as any filling placed in a tooth. I agree with him, with the possible exception that a cemented filling in a very fragile tooth will support the enamel better; but if the same care were given to amalgam and to the preparation for its insertion as is given to gold, it would be much better. I have also this to say, that there is not a city in the Union nor a society in the world that cannot point to men whose salvation has been amalgam. If it were not for amalgam, they would be out of practice. Dr. Varney and Dr. Webb were great men, and they could do what you and I could not do. If we had the skill of Varney and Webb, it would be all right; but we cannot do it. How many in this room could do it? I do not mean to say that every man in this room cannot put in a good gold filling, but I do say that no man in this room puts in a good gold filling every time.

With some trying, with the proper me-

chanical principles of retention—and I might add that extension for retention is my teaching—the poorest operator in the room can have better success with the cemented filling than with anything else.

I wish to thank Dr. Johnson for his admirable paper. It is a pleasure to me to read at any time whatever he writes, and I always feel that I have gained by having been in his presence.

Dr. GOODE. I have been intensely interested in the subject of this evening, which marks a point in the evolution of dentistry. Everything is evolution, and it takes rather an exceptional man to see many years ahead.

Dr. Perry cited an instance of seeing many years ahead when he said that twenty-five or thirty years ago he became impressed with the importance of preserving the natural forms of teeth. Lately dentists have been restoring teeth between the contact points, but now we are on the verge of seeing that we have not done right in simply filling the cavities of teeth and restoring the contact points, making our fillings so that they just clear the occlusion, leaving the walls to receive the stress; our patients are coming back with the lingual or labial wall broken off, necessitating an extensive operation.

Conservatism has done much, and will do much in the future; but how can we defend it, when we see so many patients of early middle life coming to us with their teeth lost or being lost owing to gum trouble. We do not look beyond filling the cavity. We do not protect the alveolar process. We do not build up the tooth for the work for which it was intended. Perhaps years hence we shall do so.

I feel that I should say a word of gentle protest against the remarks of two speakers who decried what they consider over-enthusiasm in orthodontia. I feel that the matter of occlusion is the biggest and broadest thing in dentistry. When we understand perfectly how to restore and maintain normal occlusion by fillings, we shall no longer have a lot of patients with loose teeth. While con-

servatism must always hold its own, we must have radical men, and the radical men are those who have advanced ideas of value. If we do not get away from the idea that fillings which are just clear of the occlusion are as good as any, we shall have trouble. We must remember the efficiency of the filling, as well as its beauty. Any tooth is beautiful, but if it is not in normal occlusion it will not remain beautiful very long. Some other dentist, after we are gone, will get hold of the case, and though he may revere the old doctor, he will have to treat a loose tooth.

Dr. NYMAN. May I correct a misunderstanding on the part of Dr. Ottolengui in regard to my remark about the appearance of gold fillings and gold inlays? I mean the appearance of the margin. There comes to my mind one of the sanest utterances that I have heard or read in connection with the old controversy that has now become new; when the controversy was so keen about extension for prevention, Dr. Perry said, "If we could only conduct these discussions beside the chair, where all parties could see the conditions, we could come to an agreement."

If we could discuss these questions by the side of the patient, where all parties could observe the kind of cavity and its environments, I think Dr. Johnson, Dr. Ottolengui, Dr. Van Woert, Dr. Evans, and the others would come to a remarkable unanimity of opinion.

Dr. HUTCHINSON. I should like to say just a few words before we close. As I understand it, the subject of the paper is rationalism, not radicalism or conservatism. It is not a question of the relative merit of gold inlays or gold fillings, but is a question of rationalism in practice, and it is high time that we took this subject under consideration.

In this era of fads and fancies we should get down to what is known as horse sense. It is the most valuable thing that any person can possess. Rationalism should teach us our own limitations. Is it rational for anyone to make a comparison between the first efforts in a new method and those which have been

proved and perfected after from twenty to forty years of practice? It is manifestly unfair. If we wish to make comparisons, and condemn or approve any method, we should make comparisons with the work of men who have perfected themselves and have become masters in that method. Let us judge by their efforts and not by our experiments. It is a common thing in our profession for a man well versed in the old methods to assume that because of his skill, which has been highly developed, he can take up any method and at all times produce perfect results. This cannot be done.

I cannot help speaking of this, because I feel so strongly about it. We must perfect ourselves, and know whether we possess the qualities which will enable us to obtain successful results, and we must make comparisons between the work of the best men in one school and the results obtained by the best men in another school.

Dr. GILLETT. I agree so thoroughly with the paper that I disagree with a large part of the application that has been made of it. I think Dr. Johnson himself failed to go far enough in many of his applications. First, I wish to side with Dr. Perry on the amalgam question, and to say that just so long as there are men in practice who know how to put in that kind of an amalgam filling, it will be a good, serviceable material.

As to this question of rationalism: Is it rational, or not, to go on practicing methods that are bringing back to us patients in middle life and younger with loose teeth and with pyorrhea pockets extending half or two-thirds of the way up the root, owing to the work which the dentist has done? Is there any criticism due the radicalism which reaches out in an effort to eliminate those conditions?

Is it rational to criticize the orthodontia of today, and to stop short with the just criticism that was made—a just and right note of warning—that the orthodontia that is coming from the hands of the poorly equipped man is wrong—without putting forward this further thought, that the orthodontia which the well-equipped men are practicing will be

one of the greatest factors in bringing our profession into its right place in the great healing art?

How shall we distinguish between rationalism and radicalism and conservatism? Is it radical or is it conservative to advocate that care of the growing child that provides opportunity for development along normal lines of that portion of the head which contains the air-passages and sinuses and the nerves of a special sense? Is it rational for a man to cling to the errors of the orthodontia of past generations and perpetuate the abnormalities in his patients' mouths by condemning individual teeth to extraction, and at the same time to plead for the saving of overhanging and even frail tooth-walls which jeopardize the work which he does, bringing discredit on dentistry because of failure, and endangering the tooth which he is trying to save?

I contend that to be the most rational kind of radicalism that leads us to search for the remedy for those deformities which have resulted in constricted air-passages and sinuses, in deformities of that portion of the skull which contains the nerves of special sense and even the lower portion of the brain case.

Dr. JOHNSON. I am profoundly grateful to every gentleman who has discussed my paper this evening. Some of the discussion has gone far afield from the subject of the paper, but that makes no difference, as long as we are gaining light, and whether we are gaining light on the subject under discussion for the present or for the future, it is profitable for us to be here.

Dr. Nyman and Dr. Hutchinson have taken the best part of my closing discussion—Dr. Nyman in calling attention to the fact that these men who seem to be so far apart are probably not very far apart after all. It seems so difficult for men to understand each other; and that brings up something that I had not expected to speak upon, but which is appropriate—that the nomenclature of the profession is such that men do not readily understand each other, because our terms are not definite. Men have frequently

misunderstood each other, because we have not had definite terms to describe the things we wished to describe.

It was not my intention to make any invidious distinction or comparison between gold fillings and inlays; I was not talking so much about conservatism and radicalism as I was about rationalism. And still I wish to refer to some of the things that were spoken of. One of them concerns the destruction of the pulp, which was not spoken of at all in my paper, but which is so important. It is not rational to try to save a pulp that is inevitably doomed, but I consider it malpractice to destroy a pulp which can be saved.

Sometimes pulps are destroyed with the cowardly saying that dead pulps tell no tales. If I have read the history of the profession right, dead pulps *do* tell tales, sometimes. I wish to state my reason for believing in saving pulps, if possible. They should be saved in teeth not perfectly developed at the apical foramen. Pulps are frequently exposed by decay before the teeth are perfectly formed at the apex; and if the pulp is destroyed, or allowed to die, that tooth is crippled for life, because we cannot insert anything that will take the place of it at the end of the root.

We are told that the pulp has no function to perform after the tooth has been thoroughly developed; but there is a factor that must not be lost sight of—a tooth the pulp of which is dead will not sustain the same masticating force as before. In other words, you may test a molar with a vital pulp, and let it exert a force on the pericemental membrane of from two to three hundred pounds. Destroy the pulp by the most careful method, treat the pulp-canal with antiseptic precautions, and fill the root as thoroughly as possible, and in six months' time that tooth will not sustain the same masticating force within forty, fifty, or sixty pounds of pressure.

There are pulps which are inevitably doomed, but most of them die from infection rather than from thermal shock; I was glad Dr. Ottolengui spoke of that, because we too frequently allow a mass

of infected dentin to remain under our filling which should have been removed.

In what I said about conservatism, referring to the remarks of one of the gentlemen, I surely did not mean the preservation of frail enamel walls in the preparation of cavities. I do not believe that it is conservatism to retain frail or unsupported enamel.

Dr. Ottolengui spoke of the necessity for postgraduate instruction in the making of gold inlays, and of the need of a better technique in gold inlay work. When I mentioned gold inlay work and the necessity for rationalism in its practice, I did not refer to the work which the better men are doing; but I do make a plea for more careful inlay work, and I would warn against the extreme of putting in cast gold inlays in every kind of cavity.

Dr. Taggart's and Dr. Black's names were mentioned. I do not believe that Dr. Black would leave a frail enamel wall. You will surely all acknowledge that Dr. Taggart is an enthusiastic inlay worker, and yet I remember when his machine was not on the market, and when men sent wax inlays to him for casting—and Dr. Taggart worked very hard for his friends at that time—he said to me privately, "Johnson, the trouble is they are sending me wax models that should never have inlays, but should have gold fillings."

I glory in that work, and I take off my hat to the man who introduced it to the profession, but I think he above everyone else would deplore the fact that the profession is abusing the method rather than using it judiciously, because it will be injured as a result, and be discredited.

In regard to what Dr. Ottolengui and Dr. Nyman said, as to a gold inlay or a gold filling being of such a character that you could not detect one from the other, I simply have to say that if you see an operation in which you cannot tell whether it is a gold filling or a gold inlay, it is a beautiful piece of work of either kind. That is the kind of operation I like to see, and I admire the man who does either one or the other perfectly.

Dr. Ottolengui, I think, defied us to show a mouth with a large number of operations, in which gold fillings would look as well in one year as the same number of gold inlays. I would mention one case that presented itself in my own practice. I have seen a mouth in which the teeth were extensively filled with gold foil; the condition of those fillings was such that I do not believe it to be possible, considering the kind of cavities that contained those fillings, for the best inlay worker that ever lived to have shown work of such perfection as was exhibited in that case, and those fillings were in not one year, but twenty and thirty years. I examined that mouth very carefully, because that work was done by a dear old friend of yours and mine, by a man whose memory will live as long as we speak of gold fillings, a man who left a record in Chicago that will class him with men like Varney and Webb, who were mentioned tonight and whom I revered; in mentioning those names we should also couple with them the name of the late Dr. George H. Cushing, whose ability as an operator I believe was excelled by no other man. I saw this case recently, in which many of his fillings had been retained twenty and thirty years, and were as perfect as on the day when they left the hands of that magnificent operator. Some of the cavities could not have been managed by any other method as well as by gold foil fillings. Yet I wish to say that in my practice I have a large field for gold inlays, a more limited one for porcelain inlays, and while I seem to suggest a plea for rationalism, I do not want to be taken as disparaging any particular kind of work, because I believe that there is a field for every rational method that has been introduced to the profession. I find a place for gold foil fillings, for the amalgam and oxyphosphate fillings, and for gutta-percha fillings—a very useful place; I have not yet found so certain a place for the silicate cements, though these may be perfected in time.

What I make a plea for is that we should look broadly at these questions. I am as enthusiastic as any man in this

room; and while I travel over the country seeing men giving clinics and noting the result of their work, my fear is that in their enthusiasm they frequently forget one feature which is very important, and that is the welfare of the patient on whom they are operating. They have an ideal of a beautiful piece of mechanism, but they follow that ideal to the detriment of the patient. Gentlemen, the ideal we should follow is the kind of operation that you would want to have done for yourself or for the members of your family.

Like Dr. Ottolengui, I have changed in my ideas. I would not do the large gold operations today which I did some years ago. I used to apply the rubber dam and put it over a lower third molar, and build that molar up with gold foil, when the distal cusp was gone and the gum covered one-half of the distal surface of the completed filling in the gingival region. I would not do that today, and yet I have no regret for that operation. It developed in me a skill which I

can use to good advantage in the best technique of inlay work, and if gold foil has done nothing else, it has been the saving grace of our men in the development of skill which is most important in our operations. Today I would use a gold inlay in such a case as the above mentioned. The gold inlay has been a benefaction, but we must not allow our enthusiasm to overrun our judgment, but study each case and do for the patient what we believe to be the best, what we would want to have done for ourselves.

Dr. NASH read the resolutions of regret on Dr. Northrop's death, which on motion were adopted as read.

The President extended the thanks of the society to the committee for their work in getting up the beautiful memorial to Dr. Northrop.

The meeting then adjourned to the banquet hall, where a collation was served.

FREDERIC C. KEMPLE, D.D.S.,
Editor N. Y. Odont. Soc.

NORTHEASTERN DENTAL ASSOCIATION.

Fourteenth Annual Convention.

(Continued from page 618.)

THURSDAY—Afternoon Session.

(Continued.)

The next order of business as announced by the President was the reading of a paper by Dr. A. P. ROGERS, Boston, Mass., entitled "Some Important Truths Regarding Orthodontia."

[This paper is printed at page 697 of the present issue of the COSMOS.]

Discussion.

Dr. R. H. W. STRANG, Bridgeport, Conn. I wish to congratulate the essayist on his subject and its concise presen-

tation. All of those present who attended the last meeting of the Connecticut State Dental Society know how I feel on the subject of preventive dentistry as related to malocclusion, and I could not do better today than to repeat some of the statements made in the paper read at that meeting, and perhaps add something to them. Before we can be in a position to aid in the prevention of malocclusion we must strive to perfect our knowledge of the normal, for we are unable, unless we understand normal development and normal occlusion, to comprehend the abnormal. How many know the appear-

ance that a jaw should present at the first year after birth? How many know the appearance that a jaw should present at the third year after birth? And so on with the various years of tooth-development. Unless we know that, it is impossible to detect malocclusion in its initial stages.

The knowledge of the causes of malocclusion is almost as important for the general practitioner as is that of normal development. These causes are not very many in number, and most of them have been mentioned in Dr. Rogers' paper. It is essential that we know what they are in order that we may be able to detect them when they first manifest themselves. No case of malocclusion ever presented itself without some cause, and the longer that cause is allowed to act, the more complicated the case becomes, and there can be no permanent result unless that cause is removed. One of the causative factors most frequently encountered is the premature loss of the deciduous teeth, breaking up the continuity of the arch so that the teeth mesial to the spaces are not carried forward as nature intended them to be, while the teeth distal to the spaces are carried forward prematurely. Another cause is the prolonged retention of deciduous teeth; another the failure of the first molar to lock normally. The most critical period in the life of the denture is between the ages of five and six years, and yet how many dentists are watching cases more carefully at that period than at any other? So often the large first molars, the most important teeth in the mouth, lock in either distal or mesial occlusion and thus make normal occlusion an impossibility. If this condition were corrected at once, normal occlusion would be possible, but of course not a necessity. Another cause is mouth-breathing, and you all realize that mouth-breathing may be present as early as during the first, second, or third year of life, and certainly the earlier it is present the greater the deformity will be. Very important in the causation of malocclusion are the habits which the essayist has mentioned today. In conquering these we must have

the co-operation of the parents. Many mothers through ignorance are apt to look upon some of these habits, such as thumb-sucking, as very cute little accomplishments on the part of their children. Only last week, in talking to a mother, I suggested thumb-sucking as a cause of the malocclusion in her child, and she became most indignant, saying she did not want that cute little habit broken up. That shows the necessity of education along these lines, and we appeal to the general practitioner to take such education of his patients upon himself. The orthodontist cannot hope for success without the co-operation of the general practitioner. Think of how many more children you see as general practitioners than we do as orthodontists, and therefore a proportionately greater field is open to you along this line of prevention, if you but watch the teeth of the children with this point in view. Very essential in the correction of certain habits is the teaching of the child to exert its will power. Dr. Angle, in lecturing to us, said that he had experienced more failures from unbroken habits in children than from any other cause. These were habits which had begun in early life and had continued so long that they could not be corrected by mechanical means, and could have been conquered only by the exertion of will power. If the child fails to conquer the habit by will power, certain methods of mental suggestion, which owe their success to the power which the subconscious mind exerts over body functions, may perhaps be used with good result.

Often, I believe, we fail to realize that there are two periods in the life-history of a human being, *i.e.* the period before birth and the period after birth. I am glad that the essayist mentioned the fact that malocclusion may owe its origin to certain conditions present in the mother, for instance, to malnutrition during pregnancy, which is an important factor in the causation of malocclusion. That is, however, a subject that has not been studied as it should be, but here again the general practitioner is situated so as to be able to obtain far more important

statistics than the orthodontist. So again I plead for co-operation.

In considering the early treatment of malocclusion, I would say that that subject appeals to the orthodontist more strongly than any other. Why? Because he realizes the importance of normal development through as long a period as is possible, and the very deleterious effects of abnormal development continued for any length of time. Therefore, when the child comes to your office at an early age, examine the teeth in order to see whether the arches are developing normally, for often at that age a very slight force exercised in the proper manner will overcome malocclusions which to correct later on would require months of treatment.

Probably the most important factor in producing normal development of the jaw is the force of mastication. The chewing and grinding of the food, transmitting a stimulating force through the roots to the bone-building cells, is the method nature uses to increase the size of the jaws so as to accommodate the permanent denture. Instinct causes the parents of the uncivilized races to give to their children something tough to chew at that early age. Thereby the cells receive stimulation, and the jaws develop so that we find beautiful specimens of normal occlusion in these races. On the other hand, the children of civilized races have become the victims of prepared foods, and normal occlusion is almost a curiosity among them.

I wish to thank the essayist for his paper, and for the thoughts that he has conveyed to me, and the stimulation which I have received from his presentation of this subject. I trust that when the paper appears in print it will be read and re-read, and its contents digested and assimilated.

Dr. GEORGE T. BAKER, Boston, Mass. I am very glad that this subject has been brought to our attention; it is very important, especially to the general practitioner, because it is he who sees the children first, and who should detect such cases of malocclusion.

Not one word, I am glad to say, has been mentioned about appliances. The

appliance is not as important as the result to be accomplished. The most important thing in orthodontic operations is to know exactly what we want to do. How many times have we seen students take impressions of cases and look at them, and if we could know what was going on in their mind, would it not be a whirl? Why so? Because the students have not made a study of the principles which underlie this science. There are principles which underlie this subject and which must be studied and given a great deal of thought, before results can be obtained. Many take a case of malocclusion and go ahead with it without giving it proper study, and later, when they have made a failure of it, they wonder why another man may take that same case and bring it to a successful result. The simple reason is that one man has taken the pains to prepare himself, while the other has not. In the matter of etiology of malocclusion, just in proportion as we have studied the causes we have made progress, and the only reason why such marked progress has been made in the last few years is that we have found out what the causes are, and have thus been enabled to remove them. But there are sometimes cases in which it is almost impossible to find what the causes are. In those cases, for instance, that we call arrested development, we say perhaps it is malnutrition, but we are unable to explain exactly why there should be any arrest of development of the jaw, or malnutrition. It may be that the brain has been over-stimulated for generations, and that the foods consumed by the race have not been what they should be. The present tendency to gratify the taste is too great, and we do not live according to nature; therefore we speak of degeneration. We have all noted the irregular structure and form of the third molars, and we all know that in a great many cases these teeth fail to erupt, just like the upper lateral incisors in many cases. To my mind the cause of that arrest of development is that nature has not had that stimulation which it would have had if we lived in accordance with natural law. We can see degeneration not only in

the permanent teeth but also in the deciduous ones. In the deciduous molars, especially in the lower second ones, we can note a marked degeneration both in form and structure, and also in their tendency to be retained too long. They are not shed at the proper period, which seems to me to be a proof that this degeneration of the teeth and face has profoundly affected the maxillary region.

Another interesting feature in the arrested development of the maxillary region is observed in the sense of smell. Darwin in his works speaks of the fact that in mankind the sense of smell is rudimentary, and that it is not today what it once was. It never would have developed at all if mankind in former times had been living with the same habits as today. Darwin speaks of how necessary the sense of smell is to the dog and other animals, because often their very existence depends on it. They use their sense of smell more than they do their eyes; the deer scents far-off danger, and the hound, because of his marvelous sense of smell, can detect his master's footsteps when perhaps hundreds have gone over the same track. Man does not have the same acute sense of smell because it is not necessary for him—his sense of smell is more a luxury than a necessity. Many people see a fragrant flower and do not appreciate its perfume, because they do not possess an acute sense of smell. To my mind this is due in part to the lack of development of the maxillary region.

If it be true that many cases of malocclusion are due to this tendency to a rudimentary condition, then we can overcome them by stimulation, and that is just what we do when we put on appliances. We stimulate growth—we push the incisor teeth forward, widen the arch, stimulate growth and simulate nature, and thereby supply the natural and normal development of the arch. To my mind, the fundamental principle governing this kind of work is to simply follow nature, and if we know what nature does in normal development, then we can do the same. The average general practitioner can do this work if he only pre-

pares himself correctly. There will always be the specialist, but this work will be done more and more by the general practitioner.

I wish to speak furthermore of the custom common in my neighborhood, of mothers supplying their children with "baby comforters"; these consist of an ordinary rubber nipple with a handle, which the child is allowed to chew to its heart's content. In many cases these comforters have done a great deal of harm; they have protruded the upper incisor teeth and have forced the mandible backward. Such habits as sucking the thumb and fingers can be corrected, if the child is old enough to co-operate with the parents and with the orthodontist and if its good-will can be gained, but if the children are too young to help themselves, radical means must be employed. Here is an appliance [illustrating] which was not designed for this purpose, but is an excellent thing for the correction of these habits. It is an aluminum glove, which is placed over the hand of the child and fastened with strings around the wrist. It is to be worn at night.

With regard to the matter of technique, I have noticed in the reports of the different societies where orthodontia is discussed that men everywhere seem to be taking a more liberal stand in regard to technique, that is, different appliances are meeting with more favor. In a paper read before the American Society of Orthodontists I notice the following passage: "For the accomplishment of our work we must have efficient appliances. I feel that I should not be true to myself if I did not make a statement as to what I have been using, and also to say that no man practicing orthodontia is true to himself or his patients who works to the exclusion of removable appliances." In discussing this paper another man, prominent in the profession, speaks as follows: "The writer rather apologized for the use of appliances not connected with the expansion arch. I think this is a great mistake. When the expansion arch was perfected, the evolution of appliances was not completed. There are many other things that are good; why should we have

any hesitancy in discussing them before this society?" This only shows the tendency toward the use of the different appliances.

Dr. F. T. MURLLESS, Jr., Windsor Locks, Conn. I wish to say a few words in regard to what, for the sake of force, may be called misguided maternity—misguided maternal feeling. While there is nothing more beautiful than maternal affection, and while the blind self-sacrifice of mother-love arouses our deepest feelings, its exercise is not always beneficent; sometimes its influence is even disastrous. The absolute neglect of some of the child's physical needs cannot be compared in its deleterious influence upon the child's well-being and development with the result of over-anxious care and indulgence.

Specifically, the use of the so-called comforter and the indulgence of thumb-sucking are mistakes. We must have a better understanding of the fact that babies, because they are babies, do not need to be toasted over a register while being bathed. Altogether too much mothering is indulged in in regard to the care of the child during the helpless period. This is the reason why the more exaggerated cases of lack of physical balance seem to occur among the "delicately nurtured." Unfortunately, the enervating influence of too great comfort is progressive, and the weakling is the victim of his symptoms.

Nothing can compare with the overheating of our houses in its effect upon the development of the face and the oral and nasal cavities. There are very few children who do not become at least periodical mouth-breathers within a month after their birth. In the beginning they have "snuffles," because of the extra dryness of the atmosphere in our houses, which is the direct result of overheating. It is supposed that a baby is not properly bathed unless the temperature is raised to upward of 80°, and unless the operation is performed close by a stove or a register or radiator and outside air is perfectly excluded. This absolutely dry heat causes abnormal evaporation from the cuticle and mucous surfaces, which means

hypertrophy, lack of function, and degeneration of the mucous membrane.

In the palatal arch we have two layers of mucous tissue, the nasal and the buccal, two layers of connective tissue beneath them, and two layers of periosteum, two petrous layers, and a thin body of cancellous bone or the equivalent cartilage, which all, in a baby, amount to perhaps not more than 1/32 of an inch in thickness. The nutrition of these parts is supplied practically by one artery and through one channel, and anything which happens to disturb the balance of the mucous membrane tends to rob the part of its nutrition; as a consequence, when the mucous membrane becomes disordered, the bone does not grow normally. This disturbance may begin at any time—at the age of three weeks as well as at that of three years. The sooner chronic inflammatory processes are established, the more surely there is need for orthodontic interference, before the physical development is completed.

I hope that I may be able at some future time to develop this subject further.

I have known several instances of subconscious impression, of which Dr. Strang speaks, which have interested me very much. I know a child who drifted into the habit of sucking his tongue when asleep, which habit was discovered by a slight movement of the lips and throat. This was a very difficult problem to manage. The habit was corrected by addressing the child by name while he was asleep without awakening him, by saying, "You must not suck your tongue." After this had been persisted in for several evenings in succession, the habit ceased entirely. On the ground of its great utility this procedure is defensible, although I am not especially interested in things occult.

I was very much pleased with Dr. Rogers' paper, and am hopeful that it will prove a stimulus to each of us to take hold of the basal things, as, for instance, dental anatomy and facial anatomy, and to learn to understand the principles that underlie our work, and by so doing build a deep and broad foundation for our greater usefulness.

Dr. A. J. NIMS, Turner's Falls, Mass. One cause of malocclusion has not been emphasized very much today, *i.e.* inheritance. We very often find in practice patients with very marked peculiarities; we have seen mothers with narrow arches and fathers with large teeth, and the children of these parents with the narrow arch of the mother and the large teeth of the father, with insufficient room for the teeth in the arch. I once saw the members of a family one at a time, and was very readily able to recognize that they were of the same family because of a condition in the teeth that was more marked than any facial resemblance; in fact their facial resemblance was not sufficient to enable one to tell that these three children belonged to the same family. In all of them there was malocclusion to such an extent that only the two molars occluded, the occlusion in the other teeth deviating by a quarter of an inch. In the front teeth, the malocclusion was so marked that I could readily see that these children were members of the same family. If we therefore can readily recognize the dental features of the parents in their children, we as orthodontists cannot overlook the influence of heredity as one of the causes of malocclusion.

Dr. ROGERS (closing the discussion). I have been more pleased by this discussion than by any which I have had the pleasure of listening to after reading a paper. I think it is a sign of the progress of our profession; it shows intelligent reasoning, and proves that we are by no means lacking in the ability to think.

I have very little to say in closing, but would make one remark, even though reluctantly. I have enjoyed the remarks of the last speaker, but I cannot agree with him. I have given to the subject of heredity some thought, also to that of environment. While it is true that certain conditions of malocclusion in a family may suggest heredity, with deeper consideration of the fundamental principles of the trouble we very readily are led to believe that environment has more to do with these conditions than anything else.

Dr. Nims spoke of the occlusion in all these cases as being a possible evidence of hereditary conditions, but we know that occlusion is due more to the habits of children than to anything else; that is, it is due to environment, habits, and conditions of life of the child. Such children as Dr. Nims cited are all brought up under the same conditions and by the same parents, and in the earlier years of their lives lived under similar conditions; they are probably laid to rest on a feather pillow, covered with comforts, with nothing showing but the eyes. We therefore need hardly be surprised to find malocclusion and a lack of development of the facial bones, which almost invariably produce mouth-breathing and stagnation, as has been so clearly and beautifully described by Dr. Murlless. A great deal has been written on this subject, and our friend Dr. Nims would have difficulty in overcoming the arguments put forth against the theory of heredity. I do not doubt for a moment that we do inherit a great number of traits and tendencies, but I do not believe that we inherit malocclusion of the teeth.

The next order of business was the reading of a paper by Dr. D. D. SMITH, Philadelphia, Pa., entitled "Alveolar Pyorrhea and Its Treatment."

[This paper and the discussion will appear in the official Transactions.]

There being no further business, the President declared the meeting adjourned until the evening session.

THURSDAY—*Evening Session.*

The meeting was called to order by the president, Dr. Griffith, at 8 o'clock Thursday evening, October 22d.

Dr. H. A. KELLEY presented the following resolution with regard to Army and Navy Dental Legislation:

RESOLVED, By the Northeastern Dental Association, composed of the dentists of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut, at its meeting held in Hartford, Conn., October 21-23, 1908:

(1) That the association conveys its thanks to U. S. Senator Morgan G. Bulkeley of Connecticut for his address on "Dental Legislation for the Army and Navy from the Standpoint of a Legislator," and to Dr. Richard Grady of the Naval Academy, Maryland, for his paper on "The Dentist in the United States Navy: an Account of the Efforts to Secure a Dental Corps."

(2) That the association appreciates the recognition of Hon. V. H. Metcalf, secretary of the navy, in having the medical corps of the navy represented at this meeting, the first instance of the kind in dental organizations.

(3) That the association welcomes the co-operation of the American Medical Association, which has authorized its Committee on Medical Legislation to assist in securing the passage of such bills for dental corps in the army and navy as meet the approval of the War department and the Surgeon-general of the navy.

(4) That the members of this association, by letters or otherwise, should give evidence to their representatives in Congress that they cordially indorse the employment of qualified dental surgeons in the navy as well as the army.

The resolution was adopted.

Motion was made that a standing committee, to be called the Army and Navy Committee on Legislation, to be composed of six members, one from each of the New England States, be appointed by the president to do all they consistently can to further the purposes outlined in the foregoing resolution.

Motion carried, and Dr. Griffith appointed the following committee: Dr. H. A. Kelley, Portland, Me., chairman; A. J. Sawyer, Manchester, N. H.; P. M. Williams, Rutland, Vt.; C. R. Lindstrom, Boston, Mass.; J. E. Power, Providence, R. I.; James McManus, Hartford, Conn.

The next order of business as announced by the President was the reading of a paper by Dr. OTTO E. INGLIS, Philadelphia, entitled, "Post-extraction Sequelæ."

[This paper is printed in full at page 693 of the present issue of the COSMOS.]

Discussion.

Dr. E. W. PRATT, East Hartford, Conn. I have not the slightest doubt

that everyone here who has had occasion to extract one or more teeth realizes the fact that all of the truth cannot be told in the extracting or in the effects on the lives of their patients after extraction. I certainly hope that the people who have been so unfortunate as to sit in my chair and to have teeth extracted have not suffered the consequences that some of the patients of other dentists have. I do not know, of course, what some of my patients have done after extraction, but I do know what some other patients have done. I can assure you that it causes one absolute distraction to have a patient come from some other dentist after extraction. I am not finding fault with anyone, but I know that as long as teeth have to be extracted, distraction will follow, and a great many of the patients whom you have at the time of the extraction will be somebody else's patients afterward. This is not always the fault of the dentist; a great many times, in fact almost always, it is the fault of the patient. The dentist is never at fault and never does wrong, but he always does the best he can, and whenever an accident happens it is not the fault of the dentist but of the patient. In fact, nine times out of ten it is the fault of the patients. If they had taken care of their teeth, if they had had them attended to at the proper time, in ninety-nine out of a hundred cases they would have had no trouble after extraction. Generally, trouble after extraction is due to neglect of the teeth on the part of the patient. It is very seldom that a person comes to you with a sound tooth that you cannot extract, if necessary, but generally the patient leaves a tooth until it is diseased and decayed up to the end of the root, and then expects you to extract it without breaking it off.

I had an experience a short time ago with a gentleman who thought a great deal of his features, and consequently wished me to preserve them if possible. He stated that he had pus in his mouth, but he did not know where it came from, whether from the mouth or the nose. I examined his mouth and found considerable swelling and inflam-

mation in the neighborhood of the bicuspid region, which I thought was caused by the root of a bicuspid. The patient said that several dentists had told him to have the tooth extracted, and I said that I should think so too, but did not know how I could possibly extract it. I said that I did not think that I could get the root, but that I would get something, if not the root, probably a portion of the jaw bone, and perhaps a portion of the nasal bone besides, but I would take anything that came in sight. The patient said he would leave himself in my hands, so I took a screw elevator, screwed it into the root, and very much to my surprise and delight the shell of that root came out. I found that the abscess had opened into the antrum, and after washing it out with a little glyco-thymolin, a little hydrogen dioxid, a little aristol, and some other disinfectants, and packing it with iodoform gauze, the wound healed in due time, very much to my surprise. I was very thankful for the result, because I was afraid that I should lose my case had a suit for damages from septic poisoning resulted from that extraction. I attributed my result more to good luck than to good management.

Dr. JOSEPH HEAD, Philadelphia, Pa. I feel somewhat reticent to speak after such a flow of eloquence as we have just heard, and which I have enjoyed so thoroughly that anything that I might have had to say has slipped my mind. I enjoyed Dr. Inglis' paper, also Dr. Pratt's remarks, in spite of his humorous way of putting it, and I think his vivid description of his experience is one that appeals to all of us who have had such cases. I think, however, that it was not luck which made that socket heal up, and that the patient made no mistake when he left the case entirely in Dr. Pratt's hands.

Concerning the liability of infection, I think that the procedure laid down by Dr. Inglis is extremely sound and very timely. These sockets are very troublesome to all of us. I have had fairly good success in such cases by the application of acids, not only of nitric acid,

which is sometimes used, but also of trichloracetic acid, which I find has a tendency to freshen the parts considerably.

Dr. C. W. STRANG, Bridgeport, Conn. We have all very much enjoyed the paper that has been presented. The association is also to be congratulated upon the fact that we have had such an admirable entertainer in the person of Dr. Pratt.

I was interested to a considerable extent in my early days in the operation of extracting, though since the centennial year I have done very little. Had I only sooner appreciated the dangers that attend some of the operations of extraction, I think it quite probable that I should have abandoned that part of dental practice some years earlier than I did.

I have to congratulate myself that I had no real serious cases of hemorrhage or septic conditions after extraction. Probably in those cases where there was excessive pain, or trouble after the operation, the patients sought relief from another practitioner, and I was relieved from the care and anxiety of after-treatment.

I have nothing further to offer. The treatment that has been advised by Dr. Inglis seems to me the most palliative and most agreeable that could be administered to a case of that particular nature.

Dr. H. A. KELLEY, Portland, Me. Professor Inglis has just spoken in regard to taking care before and after extraction, as though it were something that is always done. I wish to sound a word of warning. I am very much afraid that the average dentist is not in the habit of seriously considering the extraction of teeth as a surgical operation, an operation that should only be performed under surgical technique. I fear that the usual procedure, with or without an anesthetic, is that we seize the tooth and extract it, then allow the patient to wash the mouth with a little warm water to which perhaps an antiseptic has been added, and dismiss him; for this we usually receive a fee of a dollar or so. Some little time ago, while

speaking on this subject, I said that I had tried to practice my profession in a proper way, trying to give the proper care to cases of extraction. I explained that I treated each case as a surgical operation and charged what I considered the proper fee for the work. After me a practitioner stated that he did not believe that my procedure was necessary at all, and I may have the same experience tonight. I wish to say, however, that in my opinion this operation is performed in a very careless manner by most members of our profession, and it is time to stop. We have heard of oral prophylaxis today, and when we extract a tooth in a mouth that is clean owing to prophylactic treatment we are operating under fairly favorable conditions. But in extractions in mouths under the conditions usually encountered it is simply the grace of God that saves us from a great deal of serious post-extraction troubles.

I wish that the essayist would tell us what his surgical procedure before and after extraction and his technique of extracting is. It has always been my custom, before extracting teeth, to render the mouth as clean as possible by cleaning the teeth and spraying the mouth with antiseptic sprays, and when injecting a local anesthetic, by being very careful to spray the respective parts well before the needle is introduced. After the tooth is extracted the socket is sprayed very thoroughly, and the patient is carefully treated after the operation. We should not overlook the post-extraction care any more than a surgeon would cut off a patient's leg and tell him to go home and let it become well of itself. What must patients think of us, when we extract teeth and tell them to spit out the blood, and finally dismiss them after the bleeding has ceased. That socket should be taken care of until healing has taken place. You have seen the dangers involved in the cases mentioned by Dr. Inglis, in which patients have suffered for ten days and longer before they sought relief. This could very readily have been avoided by proper care on the operator's part. These cases should be under care and treatment until they are

past the danger-point, and then an appropriate fee should be charged for the operation.

Dr. C. E. ABBOTT, Franklin, Mass. I have enjoyed exceedingly Dr. Inglis' paper. The subject of extraction is one that has interested me a great deal, as in a general practice extracting must be done and done well. I enjoyed the remarks of Dr. Pratt and wish to say that I too have had troubles with extraction cases. Having a general practice I find it necessary to extract, and I feel that in cases in which teeth have to be extracted we should be very sure that the operation is done under antiseptic conditions, whether we do the extracting ourselves or whether it is done by a specialist. I have had serious difficulty in several cases, in which an upper third molar brought away the floor of the antrum, but warm sprays and weekly packing with iodoform gauze easily cured the trouble. I have seen the evil effects that follow the extraction of roots if the operator has not taken the trouble of examining the case after the extraction. I have noticed roots in which arsenic had been applied to the pulp, and the patient having failed to return, subsequent inflammation extended to the periodental membrane. This teaches us that we should not allow a root to remain in the mouth if it is not in a healthy condition. The greatest difficulty I have experienced with extracting roots is in cases in which the teeth seemed to have decalcified, and the roots were not strong enough to stand the force necessary for their removal. That some dentists do not take the care necessary in these extractions is proved by a statement which was made at a meeting last year, when a dentist said, in all innocence, that he used the hypodermic syringe time after time, and that all he did with it was to put it in a little warm water. That of course is malpractice. Frequently I have been very much pleased with the comforting as well as the beneficial results of orthoform applied to the root-sockets in certain cases after extracting. Many times patients blame cocain for conditions that are not due to cocain at all. I recall a case of

extracting an abscessed tooth under nitrous oxid, in which the patient reported swelling and pain, but later the case healed up normally. If I had injected cocain, this delay in healing would have been attributed to cocain. In reality it was not due to cocain but simply to the slow process of healing after prolonged infection.

Dr. A. J. FLANAGAN, Springfield, Mass. After I had been in practice for three years it always seemed to me that we were lowering ourselves to a certain extent because of a want of knowledge of what constitutes real surgical cleanliness. Dr. Kelley well voices a condition which we find day after day. If any one of you were to go to a medical practitioner in order to have a felon lanced and drained, and he were to send you home saying that no further treatment was necessary, you would certainly consider that physician a candidate for something else than professional medicine. Yet in this beloved profession of ours, as we term it, there are thousands of cases in which extraction is considered as something which needs no knowledge of pathology or asepsis. Although I dislike to discuss this subject, I am going to do so for the first time in my life. I am connected with a hospital in a city of eighty thousand people, and in the last nine or ten years many cases have come to the hospital for treatment of post-extraction sequelæ. During the first years of my appointment I was humiliated by seeing these cases and by hearing some of the surgeons say, "Here is a case of dirty instruments again." I did not say much, but I thought a great deal. After a while I began to investigate the history of these cases. In this I was confronted by a peculiar condition, for I suddenly discovered some great fundamentals, the first of which was, that in the popular opinion the dentist is the man to "pull teeth," but in case of undue after-results the patient goes to the physician for treatment. In my humble opinion this is entirely the fault of the dental profession. If in years gone by we had lived up to one-half of the knowledge of asepsis that is taught us year in

and year out, conditions would be different. If the patient comes to the professional man he expects professional service, and if a man is an honest member of his profession we have the right to demand of him not to discredit the profession which he represents. In a number of cases that I was called upon to investigate I confess that I was astonished at the conditions existing. In the first place, what are the conditions that confront every man who extracts teeth in the average dental practice? The vast majority of the patients who come to him for extractions present mouths that are in anything but a sterile condition. A bacteriologist, of course, might say that no mouth is sterile. This is true, I admit, but as a profession we must maintain that an attempt can be made to produce cleanliness, and that such cleanliness must be brought about by our efforts. What is the average procedure when an injection of a local anesthetic is to be made? Without referring to the sterile condition of the instrument that is used, I would ask, In what condition are the tissues? in what condition is the circulation? has the circulation been interfered with? are the tissues in such condition that the capillaries can take up the contents of the syringe, and regain fairly normal health? These questions in a vast majority of cases are entirely disregarded. The average dentist must remember that he is performing a surgical operation that demands attention afterward, for no matter whether one tooth or thirty-two teeth are extracted, the professional man must render professional services, and must watch his case.

In regard to the question of fees, which Dr. Kelley has spoken of, the dentist himself is to blame for the fact that some practitioners day after day extract teeth without considering the after-results, receiving fees of from fifty cents to three dollars. For not the public but the dentist determines the fee? Do you find members of the medical profession indiscriminately administering nitrous oxid or other anesthetics? Some practitioners of course may say that nitrous

oxid is the safest of anesthetics. This is true enough. But dentists are putting patients in a condition approaching death, and no matter whether nitrous oxid, somnoform, or any other anesthetic is used, every practitioner should handle each case from the standpoint of science, which his profession represents. The sooner we arrive at such conditions the sooner the dental profession will be respected by truly scientific men. A great deal is being said at present in medical circles as to infection of the glands from septic teeth, and yet how many times do patients go to the physician for treatment after extracting! In the city of Springfield we have had within the past five years two deaths that can be directly traced back to such conditions as I speak of tonight. If you will turn back in the *Cosmos*, you will find several references to cases of this kind. This gives us reason to wonder how it has come about that such a common operation, which is performed for a vast majority of people who have practically no other dental work done, is the most carelessly performed of all operations, and is the least properly paid for. Yet not the public is to blame for it, but ourselves. Physicians have said to me, "You men are all right in your field, but it seems to be truly mechanics. How much do you think of pathology? What is your knowledge of pathology? Are you taught pathology in the schools? and if so, why do you not demonstrate it? When you find infected conditions in the tissues of the mouth, why do you not act from the standpoint of pathology and therapeutics?" Those are things for us to think of, gentlemen. Yet many members of our profession say we are equal to the medical profession in certain respects. I am here to defend my profession, but I am here also to pronounce a great truth, namely, that we must advance along the lines of pathology; we must consider every case that comes into our hands completely and solely in view of the effect of the pathological condition which may come from it. True it is that we have few deaths in dentistry, and this probably is the reason why we are so in-

different. The public says, "Why, dentistry—anyone can do that without having bad results." That is the common opinion, but when it comes to the crucial test, they leave us in the lurch. If anybody should doubt my statements, let him associate himself with some intelligent physician, go on the staff of a hospital and trace some of the cases, and his eyes will be opened. Our most frequently performed operation is the very one that we almost deny as producing or possibly involving subsequent pathological conditions.

What is the effect of publicity such as this on the minds of the laity? I do not mean to discuss that with you; you must consider it for yourself, and must know what it is. With all honesty I maintain that if there is any one thing which our calling needs, it is a little logic, a little book knowledge, and the realization by each of us that he is only one of a great number, but that each nevertheless is responsible to uphold the dignity of the profession which we represent, and that the time has come when, as has been said by a man in Indianapolis, the average dentist lives not only in a tooth. How much truth there is in that! The dentist whom I revere and respect is not necessarily the man who has a medical degree, but the man who goes through life doing everything he can to reflect dignity and honor upon the profession that he represents, exerting every effort to better himself and better his profession, always working, always striving. If that were true of every member of every dental society, of every dental college, and of the profession at large, think how much higher our profession would stand!

In closing, I say that not the physicians, and not the public, but the dentists are to blame for many of these sad conditions.

Dr. INGLIS (closing the discussion). Dr. Pratt, the first speaker, brought out the point that the neglect of the patient might bring about serious conditions. That unquestionably may occasionally be the case, though the patient should receive instruction as to the future care

of such conditions. I believe that the neglect really lies with us practitioners in that we do not sufficiently cleanse the tissues around the teeth before extraction. While personally I do not perform extractions, I have on several occasions taken the precaution of seeing that the patients were particularly careful to sterilize their mouths. In some experiments made some years ago, using potassium permanganate as an antiseptic, I found that my mouth could be rendered practically sterile overnight by the use of a strong solution. That is to say, while under ordinary conditions in my own mouth an acid reaction would supervene within twenty minutes after I had used sodium bicarbonate, which was not germicidal, to render it alkaline, when I used the strong solution of potassium permanganate to sterilize the mouth I found that the acid reaction could not be produced an hour after a meal. The alkaline condition often would be maintained overnight in those parts of the mouth that had been reached by the potassium permanganate. I feel therefore that strong solutions of potassium permanganate applied after cleansing the field around the necks of the teeth will serve as an efficient germicide. Kelley uses it for hand sterilization.

I have in mind two cases, one of which I described. The patient was the mother of a young lady who had to have a lower right third molar extracted. I sent the daughter to the same extractor, but told her to rinse her mouth with a solution of potassium permanganate the night before and during the morning on which she was to go to the extractor. Of course, I had plenty of time in that case; the extraction was very successful, and I saw the patient a day or so afterward, finding that everything was progressing nicely.

DR. H. A. KELLEY. The extractor did not use any precautions?

DR. INGLIS. None; he simply took the tooth out. In both these persons there is a malnutritional condition, evidenced in the finger-nails. They have suffered more or less from a hyperacid systemic

condition, and have been under treatment.

Trichloroacetic acid, as suggested by Dr. Head, is a very nice application for the superficially ulcerated alveoli, the idea being to produce an eschar, which stimulates and sterilizes in one operation.

I should like to bring out the point that free bleeding has been considered an advantage, as it washes away foreign material.

Dr. Flanagan commented on the sterility of the mouth. Dr. Woods Hutchinson in a recent article stated that while milk can be sterilized by heat, certain valuable principles in the milk are destroyed, but by strict cleanliness in handling the cows the bacteria can be reduced to about one hundred to the cubic centimeter, which is considered practically sterile milk for babies. That is to say, the organism can take care of a few bacteria, while great numbers involve danger.

Referring to Dr. Flanagan's question, it is naturally likely, if the gum is unclean, that the needle will become unclean as it is introduced into the tissues. The gums should be treated antiseptically before the needle is introduced.

I should like to ask Dr. Flanagan whether the fatalities he mentioned were due to pneumonia or to dental infection?

DR. FLANAGAN. They were due to infection from the teeth.

DR. INGLIS. Some gentleman has made the statement that pneumonia is frequently the sequel to extraction. I have had a great many cases of extraction at my college, but I do not know of any case in which pneumonia followed. Such cases may be brought to the hospitals, and for that reason not come under our observation at all.

The subject was passed, and the next order of business was the installation of the newly-elected president, Dr. J. E. Power, Providence, R. I., who was escorted to the chair, and in a few appropriate words accepted the insignia of office from the retiring president, Dr. Griffith.

Motion was then made and carried to adjourn until Friday morning.

FRIDAY—*Morning Session.*

The meeting was called to order on Friday morning, October 23d, by the newly-elected president, Dr. Power, at 11 o'clock.

The Board of Censors presented a number of applications for membership, and on motion the report was accepted, and the applicants duly elected.

Dr. E. S. GAYLORD read a communication from Dr. J. Leon Williams, London, Eng., on the necessity of improved forms for artificial teeth. In connection with the above communication, Dr. Gaylord presented the following resolution:

RESOLVED, That this association heartily indorses the several suggestions of Dr. J. Leon Williams relative to needed improvement in forms of artificial teeth recently published in *Items of Interest*, and also presented to and adopted by the National Dental Association at their last meeting.

RESOLVED, That a committee be appointed by this body to confer with the manufacturers and members of our profession who are able and willing to assist in bringing about the suggested improvements.

Motion was made and carried that the resolution be adopted.

Dr. James McManus moved that the retiring officers and committees be ex-

tended a vote of thanks for their efforts in making the meeting a success.

Motion carried.

Dr. A. J. Flanagan moved that a vote of thanks be extended to the DENTAL COSMOS and to Dr. Anthony, with the expression that the association still appreciates the courtesies of the COSMOS and of Dr. Anthony as in years past.

Motion carried.

Dr. Charles McManus moved that an expression of sympathy be sent to Dr. Thomas Mound of Rutland, Vt., in his recent illness.

Motion carried.

Dr. Griffith moved that a vote of thanks be extended to the local press for the dignified and complete reports made of the sessions of the association.

Motion carried.

Dr. Flanagan moved that a committee of three be appointed by the Northeastern Dental Association to report at the next annual meeting, to take into consideration the lack of co-operation which seems to exist between the dental examiners of the country and the dental societies at large, and to take steps to bring about a closer relationship between the dental examiners and the dental societies.

There being no further business, motion was made and carried that the Northeastern Dental Association adjourn until its next annual session.

FIRST DISTRICT DENTAL SOCIETY OF THE STATE OF NEW YORK.

Monthly Meeting, February 1909.

A REGULAR meeting of the First District Dental Society of the State of New York was held on Tuesday evening, February 9, 1909, at the Academy of Medicine, No. 17 West Forty-third st., New York city.

The president, Dr. Taylor, occupied the chair, and called the meeting to order.

The Secretary read the minutes of the December meeting, which were approved.

Dr. JOHN D. THOMAS of Philadelphia then read the paper of the evening, entitled "The Extraction of Teeth: Local Anesthesia."

[This paper is printed in full at page 665 of the present issue of the COSMOS.]

Dr. THOMAS. I do not know whether it is necessary for me to make any apologies for presenting this paper to you. It was prepared at the suggestion of Dr. Kirk for publication in the COSMOS, but somehow our friend Dr. Walker heard of the fact that it was in existence, and he and Dr. Kirk insisted that it should be brought here.

I have here some specimens of teeth which I have observed in daily practice, and which I want to pass around. (See Fig. 1, page 668.) These specimens show the conditions and the necessity for extraction which I refer to in my paper.

I have here also a number of pieces—and these are only a few of the cases that occur—that have resulted in sequestra. (See Fig. 2, page 674.) In one case particularly, in taking away the piece of bone the dental nerve was severed, causing paralysis of the lip. It is the injection of cocain that will produce such a state of inflammation.

Here is a third molar, to take out

which an unsuccessful endeavor had been made. (Fig. 3, page 676; case 2.) The patient came to my office about two weeks afterward; the attempt at extraction had resulted in the tooth being completely embedded in pus. There was such an area around the bone just opposite the area of paralysis that was produced by the bone.

Here is a third molar which beautifully illustrates that. (Fig. 3; case 3.) It is a perfectly good tooth, and there was no reason for its being taken out except that there was no occlusion and there was a cavity to be filled in the neighboring tooth. Six or seven injections were made and then the man's courage failed, and the tooth was not extracted. He came to my office presenting a bed of suppuration; you will see the bone just around the margin where paralysis was produced, and here is the septum adjoining the second molar. This will show you the results of the use of cocain.

Illustrative of what I have said in regard to the prolonged retention of an abscessed tooth involving its environment in the lower jaw, here is a tooth with an abscess—one of the largest that I ever saw. [Exhibiting specimen.] It had been in this condition for a long time; you can see this sequestrum did not grow in a week, or even in six weeks. The tooth was considered to be in good condition, and a crown had been placed upon it within six weeks of the extraction. It was a first molar, and it was involved clear down to the dental nerve, which was visible and sensitive to the touch. This is an instance where by the filling up of that bone in that socket, in time one of those beautiful cases of tic dou-

loureaux will be produced which are a puzzle to all practitioners of dentistry, and of medicine as well.

Discussion.

Dr. HASBROUCK. I am totally unprepared to discuss this paper, not having had an opportunity to look it over before hearing it this evening. It shows that Dr. Thomas has taken a great deal of care in its preparation, and I should not like to discuss it without being properly prepared.

I was informed over the telephone last week that I might be called upon to take part in this discussion, and that I should look up a few points and raise opposition to his statements. I cannot do so, because with most of the statements of the essayist I agree. I have, however, taken some notes upon certain points, of which I will speak.

In the first part of his paper Dr. Thomas states that prophylactic treatment may reduce the amount of extraction. It may, but I do not think that it would make much difference in the long run. Our professional friends are apt at times to let their professional enthusiasm run away with their better judgment during treatment for the preservation of teeth. We extracting specialists so often see the results. It is not unskilful treatment—I should call it an error of judgment—but these enthusiasts are apt to let cases go on too long, and if they would consider the unpleasant results which sometimes follow, I think that some teeth would be extracted long before extraction is deemed advisable by them.

I was struck by the phrase that the extractor of teeth is more praised for his skill and more apt to receive condemnation for his failures than any other operator. This is perfectly true. When the sufferer is relieved almost by magic he cannot speak too well of the operator, but when the failures come—and none of us is infallible—condemnation follows.

The after-treatment following tooth-extraction I cannot emphasize too strongly. The profession in general—and

the members of dental societies represent only about twenty-five per cent. of the profession at large—is apt to consider the trouble at an end the moment a tooth is pulled out. Dr. Thomas has very aptly called your attention to the serious results that may follow an operation for extraction, and in many cases, unless after-treatment is carefully followed up, either by the specialist or by the dentist who referred the patient, the results are not just what we would desire.

Dr. Thomas' points in regard to root-amputation are well taken. The result is so problematical that we can hardly feel justified in resorting to an operation which involves so much discomfort and considerable risk.

The third molars I have come to treat with a great deal of respect. They are always the bugbear of the extracting specialist; the inflammation resulting at times is most severe. Sometimes you will operate on a lower third molar with the tissues in a comparatively healthy condition, but owing to some unforeseen irregularity of the root or some other complication, you may have to resort to a manipulation or operation much more extensive than you had expected. Before you have finished, your patient may be in a condition that obliges him to go to bed for a day or two. This picture is not overdrawn, and when the removal of a lower third molar is advised the adviser is assuming considerable responsibility, and it behooves him to think it over carefully before he gives that advice.

I quite agree with the essayist that in some cases it is better for the patient and for everyone concerned that the second molar be sacrificed, if not in order to facilitate the removal of the third molar, at any rate to make the patient comfortable.

There is one point on which I cannot agree with the writer, *i.e.* when he advocates temporary, we might say palliative treatment of inflamed conditions caused by the lower third molar, in which I think he said that he would cut off the crown or extirpate the pulp. I should not ad-

vise such treatment. I think we ought to operate. If we cannot extract the tooth under ordinary conditions, we ought to operate surgically; for if any source of trouble exists, it should be removed with the least possible delay.

In regard to nitrous oxid, we know no anesthetic which can be compared with it for tooth-extraction or any minor operation. It is unquestionably the best; the mortality being the least. If we keep accurate records, we cannot report a higher mortality than one in 100,000, and think of the millions of people who are given nitrous oxid all over the country! It is almost fool-proof, and only occasionally some of us lose a case. Nitrous oxid can be given in combination with oxygen or air. With oxygen the results are not so good, I find, in dental operations, as are those obtained with pure nitrous oxid, nor do I find the results with air any better.

As regards the injection of local anesthetics, cocain in particular, Dr. Thomas has probably drawn a rather strong picture of the evil results. It is proved in the main that these results do occur, but I do not feel compelled to interpret his paper in the sense that they happen so very often. If we are careful and particular as to antiseptic precautions during the application of a local anesthetic, the probability of untoward results from sloughing or similar conditions is quite remote. We are always likely to encounter danger from cocain poisoning. There are no signs by which we can judge of the susceptibility of a patient, and we must be prepared to have a bad result in every case. I have seen bad cases, but have never had any bad results from cocain in my own practice, since I use it only rarely. Probably I do not inject cocain once in six months. If I am called upon to use a local anesthetic, I use the eucain solution—a four per cent. solution of beta-eucain, to thirty minims of which I add two drops of adrenalin chlorid. I consider that safe, simply because I have had no bad results in some hundreds of cases. Once a physician told me that he had had severe sloughing following the use of

eucain in an operation. I suggested that he might not have been as cleanly during the operation as he thought, but he did not seem to regard that point as worth considering.

There is one point that our essayist did not touch upon in regard to anesthetics, and that is the psychic effect. I have had remarkably good results in a number of cases by injecting plain sterile water, and in many of them I have been told that the patient did not feel any pain whatever. I am quite sure that in all our local applications we must consider that point. If you have a patient who is at all apt to be influenced by suggestion, I think the chances of your success are very good.

I cannot quite agree with the essayist in his statement regarding adrenalin, namely, that it is apt to coagulate. I do not think so. I thought that it acted principally as a vaso-constrictor, limiting the area to be anesthetized. I would consider it advisable to use the adrenalin mixture with all injections.

I have here a list of a number of local anesthetics. Cocain heads the list. Eucain I have spoken of as being, in my opinion, considerably safer than cocain; then there is tropa-cocain, not so toxic, but much less effective. Acoin we find to be very irritating, and much more toxic than cocain. Nirvanin has but slight anesthetic value. Alypin and stovain are very irritating, injections of these solutions being followed by more or less severe pain, and occasionally by gangrene. Novocain is supposed to be seven or eight times less toxic than cocain according to our physiologists, and in the future may be used more generally.

Clinically, I have had very little experience with any of these drugs excepting the cocain and eucain solutions.

Dr. JOSEPH E. LUMBARD. I am not a dentist, and have never extracted teeth, and certainly do not want to do so, after hearing these reports this evening. I am interested in nitrous oxid from the standpoint of the anesthetist. The operations I come in contact with are somewhat longer than those occurring in the ordinary field of dentistry. Dr. Thomas I

think is a little easy on the death-rate, because Hewitt of London, who is a recognized authority on anesthetics, cites at least seventeen fatalities between 1860 and 1890, and I am sure that we have had some since then, as there have been a few in this city that I know of.

Many people think that nitrous oxid can only be used for a short operation, as in dentistry, but in my opinion it can be used for all minor operations, and for a great many major ones. Nitrous oxid is becoming more popular than ever. The anesthetic generally used in this city is nitrous oxid and ether. It is only to prolong the effects of the nitrous oxid that the ether is turned on; but in many cases nitrous oxid has a very promising field, especially if used with oxygen. It is the safest combination of anesthetics obtainable, and really the most satisfactory from the standpoint of the surgeon, the patient, and the anesthetist.

I should like to ask so eminent an authority as Dr. Thomas three questions. These three questions were given as contra-indications to the use of nitrous oxid in the report of the American Medical Association's committee on anesthetics. These contra-indications were as follows:

- (1) Nitrous oxid should not be employed in patients with dilated hearts, or in those with extremely bad hearts, whether with valvular or myocardiac disease.
- (2) It is not suitable for young children on account of their fear of the mask.
- (3) It should not be used in cases of narrow or abnormal air-passages, of enlarged lymph nodes, goiters, or enlarged tonsils, or adenoids.

I do not believe that any of these contra-indications are correct, but I should like to hear the opinion of Dr. Thomas, as he has had a very large experience.

Nitrous oxid should receive more attention in our dental and medical colleges, and should be used more frequently by both dentists and general surgeons.

Dr. THOMAS (closing the discussion). I was very much interested in the remarks of Dr. Hasbrouck. The extraction of teeth is a very important part of the practice of dentistry, and as the sys-

tem of practice has become so complicated today, it requires special skill to perform this operation with as little injury as possible.

Third molars, particularly the lower ones, are the most perplexing. The variations of their presentation in the efforts of eruption are the cause of an infinite amount of suffering, and require the most careful consideration.

If they are free from decay, the inflammation cannot be caused by a putrescent pulp or an infected membrane about the root of the tooth, but by pressure brought about by its impacted position. These conditions may frequently be relieved by free blood-letting, until the tooth is sufficiently advanced to admit of its extraction without undue injury.

If the tooth should be tilted forward so that the crown points to the posterior surface of the second molar, and its position is such that its extraction would result in great suffering on the part of the patient, I have recommended the removal of the second molar, leaving the third molar standing alone. This relieves the impacted condition, the inflammation disappears, and the third molar will grow up and in a measure take the place of the second molar. If a tooth lies in a lateral or parallel position with the jaw, then here is but the one alternative, that is, to put the patient under ether and with a bur cut away the bone sufficiently to allow of the removal of the tooth. The only objection which I have to such a procedure is that you have to remove the second molar anyhow in such operations, and I prefer to take the second molar and await further developments.

In reply to Dr. Lumbard I would say that in cases of heart trouble I depend upon the general vitality of the patient. The gas does not affect the heart function, and to my mind there is no more fear of the heart stopping under nitrous oxid than there is in natural sleep, except that it may be affected by previous suffering and extreme nervous excitement immediately preceding and during the administration. A heart that has been

over-stimulated by nervousness and fear to such an extent as many patients exhibit in anticipation of the taking of an anesthetic must always be approached with extreme caution, and these are cases that must be declined. I had one case of a patient who was victim to the weakening effects of the grippe upon the heart, to whom I refused to give the gas one afternoon. The next day I received word that he had died. There is no necessity for running such risks as that. It is far more dangerous to give nitrous oxid to an athlete who has taxed his powers to the point of exhaustion and collapse than it is to administer it to a patient whose heart is what we term a bad one, and yet whose nerve and muscle strength have never been abused.

I never use a face-piece. Nitrous oxid, though composed of nitrogen and oxygen, does not give up its oxygen at the temperature of the human body, consequently we have a dual effect produced, one being true anesthesia and the other asphyxia, and there are some cases which will asphyxiate before they will anesthetize.

Narcosis produced by asphyxiation is a very disagreeable exhibition, as well as a dangerous one, therefore I use the mouthpiece. I can keep in view the lips during the whole process of administration, and should asphyxia appear, by

raising the lips and allowing a portion of air to pass in with each inspiration the color will be preserved, and perfect anesthesia will be produced. Oxygen combined with nitrous oxid will prove quite as satisfactory, but for the short operation of tooth-extraction I prefer the less complicated operation and the simplicity of the process.

Imperfect breathing is the cause of greater anxiety in administering nitrous oxid than is impaired heart function.

Cases of asthma, goiter, enlarged tonsils, and thickened bronchiæ must be watched very carefully, for the reason that when the asphyxiation is rapid and prominent, oxygen is taken up very slowly, and should the respiratory effort become slower or entirely suspended, which effect is produced in narcoses by the want of oxidation, artificial respiration may become necessary.

All these symptoms of danger may be overcome by keeping the color of the blood in view as shown through the membrane of the lips.

I thank you for the kindly interest shown in the subject of my paper.

Dr. WALKER moved a hearty vote of thanks to the essayist, which was unanimously carried.

Adjournment.

HERBERT L. WHEELER, *Sec'y.*

THE DENTAL COSMOS

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PHILADELPHIA, JUNE 1909.

EDITORIAL DEPARTMENT.

STRAINING OUT THE GNAT AND SWALLOWING THE CAMEL.

FROM the Proceedings of the Royal Society of Medicine, Section of Anesthetics, meetings of January 20 and February 5, 1909, we gather the information that the General Medical Council of Great Britain has, in general terms, given its approval to a proposed parliamentary enactment entitled "General Anesthetics Act, 1908," which provides that no "person other than a legally qualified medical practitioner" shall be permitted to administer or cause to be administered to any other person, by inhalation or otherwise, any drug or substance, whether solid, liquid, vaporous, or gaseous, and whether pure or mixed with any other drug or substance, with the object of producing a state of unconsciousness during any medical or surgical operation, act, or procedure, or during childbirth," under a penalty, after conviction, of ten pounds for the first offense, and in case of a subsequent conviction a penalty of twenty pounds.

Section 2 of the proposed act provides that all examining bodies recognized by the General Medical Council of Education shall require of all candidates for qualification evidence of thorough instruction in anesthetics, both theoretical and practical, and that they shall have personally administered anesthetics under the supervision and to the complete satisfaction of their respective teachers.

Section 3 exempts all dentists registered under the act of 1878 and before the passage of the present act to the extent that they may use anesthetics as required during any dental act or procedure. That is to say Section 3 of the proposed act permits the use of anesthetics by dentists who were registered after the act of 1878 was passed, but excludes from the use of anesthetics all dentists who shall register after the passing of the proposed General Anesthetics Act here under consideration; it regards the privilege of administering anesthetics enjoyed by dentists under the act of 1878 as a vested right, but the new bill proposes to abrogate that right for all dentists who register after its passage.

We do not know who is responsible for the drafting of this extraordinary measure, so that what we may say of it in a critical way is quite impersonal in its application, but taken as a whole it strikes us as an amazing example of attempted legislative stupidity. Shades of Horace Wells, Morton, and Simpson—to say nothing of Sir Humphry Davy! Anesthesia a dental discovery—the greatest boon ever bestowed upon humanity for the relief of agony and suffering, given to the world by dentists—and now a few superserviceable medical enthusiasts of monopolistic tendencies would arrogate to themselves the exclusive right to dispense its blessings.

But the supporters of the scheme contend that fatalities occur from the administration of anesthetics by the unskilful. Dr. Hewitt reports* no less than “*six deaths* from nitrous oxid in the last *twenty-one years* in the hands of persons with no medical qualification.” Unfortunately the same speaker was not called upon to report the number of deaths in Great Britain from chloroform administrations given by “persons” with a “medical qualification” during the same period. It is regrettable that these figures were not also demanded; the comparison would have been

**Vide* Section of Anesthetics, Proceedings Royal Society of Medicine, vol. ii, No. 4.

interesting and instructive. To stand complacently watching the increasing record of chloroform fatalities piling up with grim regularity year by year, and at the same time burst out in a spirit of pious regard for the public weal by attempting to prevent the extraction of teeth under nitrous oxid anesthesia unless the patient is able to pay the fee to a qualified medical man for dispensing it, is a picture of consistency that would be humorous if it were not pathetic. It is true that it is difficult to obtain reliable statistics covering the administration of anesthetics, but it is certainly well known that deaths from chloroform outnumber both absolutely and relatively those caused by any or all of the anesthetics in common use. One death to four thousand administrations is the lowest rate which careful observers can claim for chloroform, whereas estimates give one death in a quarter of a million administrations as being well within the record as to nitrous oxid anesthesia. Besides which, chloroform is as a rule administered by qualified medical men, whereas nitrous oxid is administered mainly by dentists, some qualified, many not qualified at all except by the courage of their ignorance. The death-rate from nitrous oxid is less than the death-rate from the operation of British railways, and probably more people are killed by street accidents in London in one day than in a lifetime of nitrous oxid administrations. Or, more to the point, it is probably true that more people die from the operation of tooth-extraction and the conditions which necessitate the operation than die from the inhalation of nitrous oxid. Considering the many cases of unrecognized heart trouble, and the avoidance of shock which nitrous oxid secures, it is the opinion of competent students of the question that it is safer, all things considered, to extract a tooth under nitrous oxid anesthesia than to perform the operation without it;—therefore, why not draft a bill to prevent dentists from extracting teeth?

It is inconceivable that this proposed act will receive the serious consideration of the British Parliament, or that it would receive serious consideration by any body of men who were capable of seeing beyond the limits of a narrow specialism. The bill contains a clause providing for a more thorough training by all who use anesthetic agents for the purpose of "producing unconsciousness." This feature of the proposed act is admirable as far as it goes, but in principle it is like requiring a poison label to be

placed upon the corrosive sublimate bottle and a few others, like strychnia and arsenic, in a chemist's shop, and letting the others speak for themselves, the natural inference by the uninformed being that the contents of the bottles without the poison label are harmless. The analogy arises from the fact that the proposed act applies only to drugs used for producing unconsciousness by inhalation; but what is to be done about cocain and its salts? Is the dentist or the otherwise medically unqualified person to be permitted to use cocain and allied analgesics without let or hindrance? Is not the death-rate from cocain injections as great or greater than from nitrous oxid? Are not the injuries and surgical disorders following the ignorant and empirical use of local anesthetic drugs by injection as pertinent conditions for legislative regulation as nitrous oxid anesthesia?

About once in so often there is an outburst of medical righteousness which manifests itself in an attempt to regulate things by law so that the public will be driven more definitely under medical control under the assumption that the dear public cannot be very safely trusted to look after its vital affairs. Medical legislation has gone so far that the reproduction, vital maintenance, and ultimate departure of the human race, in civilized communities at least, is in its main features under medical supervision. As a general proposition it may be conceded that some supervision of what is generally grouped under the term "the public health" is needed, but on the other hand the public can, to a limited extent at least, be trusted to take care of its own health interests, and as on the whole it can be very clearly shown that the public has not suffered very great damage by the administration of nitrous oxid even by "persons without a medical qualification," and as its casualties resulting from the ministration of persons with a medical qualification are known to be infinitely more numerous, we are of the opinion that no serious-minded or practical body of legislators will be found either in England or elsewhere who will feel that circumstances will warrant them in passing an act depriving the public of the comforts and benefits of nitrous oxid anesthesia in dentistry excepting at the behest and under the sanction of the medical practitioner.

We have drawn attention to this proposed legislation because of the medical attitude of mind which it represents, an attitude

which presupposes that a medical qualification is a guarantee of safety in all that concerns public health, and by inference that the dentist is not qualified to take care of those features of the public health that naturally fall within his province. The general public is better informed as to the facts in the case, and not being influenced by professional prejudice or professional interest in such matters can be trusted to form its own conclusions, and through its representatives in legislative bodies to defeat any such narrow-minded attempts at class legislation as they arise.

Correction.—In the article by Dr. C. S. Van Horn, "Some Phases of the Casting Process," printed in our May issue, the temperature indicated in the words (see page 548, line 14)—"the wax, which has previously been softened in water at 183° F.," *should read* "138° F."

REVIEW OF CURRENT DENTAL LITERATURE.

[*Le Journal Dentaire Belge*, Brussels, March 1909.]

MULTIPLE DENTAL CARIES OF ULTRA-RAPID PROGRESS. BY DR. EMILE HUET.

THE case reported gives rise to an inquiry as to the most efficacious therapeutics in caries of ultra-rapid progress. The patient was a young girl of seventeen years of age, who had presented for regular examination twice a year since 1902. In 1900 the first molars had been extracted for unknown reasons. In January 1905 a small caries of the second degree in the occlusal surface of the upper left second molar had been treated; nothing particular was then noted except some eroded pits due to measles. The other members of the family show no dental anomalies. On April 8, 1908, the patient came complaining of slight sensitiveness on the left side. Caries at the necks of the upper left canine, the upper left lateral incisor, and the lower right canine was noted, and the use of a very soft tooth-brush and a mouth-wash recommended. On April 13th,

five days later, the upper right second bicuspid and the upper right second molar were attacked by caries. The reaction of the saliva was alkaline. The carious areas were touched with a 10 per cent. solution of nitrate of silver. On April 27th decalcification had stopped at the cauterized parts, but the upper left second molar was affected with caries. On May 11th, the approximal mesial surface of the upper left central was affected, and a temporary cement filling was inserted. The upper right central, the upper right lateral, the lower right first bicuspid, and the lower right second bicuspid were affected. On May 16th new whitish spots were noticed on the lower left canine, lower left first bicuspid, upper left first bicuspid, upper right canine, upper right first molar and lower right second molar. Syrup of calcium phosphate was prescribed internally, and a sea-air cure was decided upon. On May 30th two new pits had developed on the approximal surfaces of the upper left canine, the approximal portions of the crown having been lost. On June 10th the spot in the lower right

second molar had developed into caries. A sea-air cure of four months was prescribed, in the course of which the patient was continually watched. On July 13th the sensitiveness had disappeared, no new lesions were noted, nor was there any aggravation of the old ones. On August 20th, except the disintegration of the labial surface of the upper left canine, the status was a very satisfactory one, a decided arrest in the progress of the caries having taken place. On October 17th, when the patient returned from the seashore, no new lesions had formed, and the sensitiveness had entirely disappeared. On December 2d, the symptoms of sensitiveness reappeared everywhere. The upper left lateral, entirely corroded around the neck, had the aspect of a pediculate organ, only the upper part remaining intact. On December 9th, the lower left canine was eroded on its occlusal surface. On December 15th, general sensitiveness without any improvement was observed, and iodo-tannic syrup and calcium phosphate were prescribed. On December 23d, the sensitiveness had still increased, and the lower right central and lateral, the lower left second bicuspid, and upper left second bicuspid were carious.

Analysis of the urine gave the following results: Quantity received 950 c.cm., quantity in 24 hours 950 c.cm., reaction slightly alkaline, density 1030, appearance clear, color yellow orange, no albumin, no pus, no blood, no sugar, no biliary coloring agents, Ehrlich's diazo reaction negative, Hay's reaction negative. Neither before nor after centrifugalizing were there any crystals, cells, or abnormal elements in the urine: chlorids 15.39 grams, phosphates 0.95, urea 24.32, uric acid and purin bodies 1.14, nitrogen total 13.832, nitrogen in the urea 11.35 or 82.06 per cent. of the total nitrogen, nitrogen in the purin 0.38 or 2.75 per cent. of the total nitrogen. The actual acidity was 8 units, 8 c.cm. of a decinormal solution of caustic soda sufficing to neutralize the urine in presence of phenolphthalein. Note that only the phosphates were present in insufficient quantity. On December 30th, the sensitiveness was diminished except in the anterior teeth. On January 6, 1909, the appetite had increased, the pain had ceased, and no new lesion was observed. The reaction of the saliva had always been alkaline. The patient had never been submitted to acid

medication, and no modification of her diet was advised, as she never used vinegar, cider, tomatoes, fruit, sugar, or confectionery to excess. During this affection no general disease, nor any lesion of the buccal or pharyngeal mucous membranes was observed.

This affection has been described by various authors as being characterized by the softening and the progressive destruction of the hard dental tissues proceeding from within outward and producing in the crown more or less profound cavities. During the examination of this case opacity of the enamel on transillumination and its transformation into white chalky furrows could be regularly observed within a few days; at a more advanced stage the enamel prisms were literally shed, leaving cavities with sharp borders. The dentin was invaded by excessively rapid decalcification keeping pace with the lesions in the enamel without retarding the progress of the latter.

In regard to its etiology this case tends to confirm the theories advanced by Black and Williams, who attribute the cause of caries not to a fault in the calcification of the teeth, but to an alteration in the oral secretions. Since the salivary reaction remained constantly alkaline, the author cannot explain the ultra-rapid and general dissociation of the enamel prisms. The accelerated dissolution of the dentinal tissues, however, confirms the existence of a reaction upon the dentin by caries. If the hypothesis of an extraordinarily intense odontoclastic reaction is accepted, the rapidity of the progress of the dentinal destruction is explicable. The cellular elements, in trying to combat the invasion of microbic agents, are transformed into odontoclasts, which have the function of freeing the tooth of hard altered tissues. If this reaction is abnormally intense, it results in a stimulation of the destructive process. We have then real dentinal self-destruction due to phagocytosis of dentinal elements under the influence of excessive odontoclastic activity.

The rapid progress of the caries suggested a treatment which would arrest the destructive process. For this purpose the parts affected were painted at regular intervals with concentrated solutions of silver nitrate, the restoration of the teeth being reserved for a later period. The protective action even of a 10 per cent. solution of silver

nitrate was manifest, although the invasion of the dentin could not be allayed. The question as to the mode of action of silver nitrate is still an open one. Does it, by being precipitated into the superficial layers of enamel, form a more or less impermeable protective cover against external agents, or does it act by stimulating the odontoblasts to the production of reparative tissue? The case described suggests a double problem. As for prophylaxis, is the predisposing cause of caries to be sought in the saliva, and, if so, would a modification of diet favorably influence the composition of the saliva? Since the sea-air treatment seems to have arrested the progress of the affection, would mineral waters containing calcium bicarbonate have a prophylactic effect? Or is Lohman's theory to be relied upon, who attributes the formation of caries to the mucin contained in the saliva, and can its obnoxious influence be attenuated by giving the antidote, Berthollet's salt? Or is the efficacy of the protective action of fats as suggested by Kleinsorgen to be trusted? (See *Cosmos*, August 1908, p. 881). As to the therapy of the already existing lesions, what means should be employed to arrest decalcification and to stimulate reaction before undertaking the restoration of the lost parts?

[*Archivos Latino-Americanos de Pediatria*, Buenos Aires, July 1908.]

ODONTOCLAMIS (TOOTH HOOD). BY DR. J. M. JORGE, JR.

The case described in this report is of little interest from the surgical point of view, but it constitutes a curious anomaly in the eruption of the permanent teeth. The history of the case under consideration is the following: R. P., eight years of age, has always enjoyed good health excepting some slight indispositions. The first dentition was normal, all the deciduous teeth erupting in correct number and position. At six years of age, the patient's deciduous teeth began to shed, the upper incisors falling out first, then the laterals, no trouble being experienced. The alveoli showed no signs of inflammation. Later, the patient's father noted in the region of the upper central incisors a wide area of inflammation, which was smooth lingually and of reddish color like the gum, and resembled an appendage. The in-

flamed elevation gradually increased without causing any inconvenience, and extended above the lateral incisors. The patient presented on January 8th, complaining of pain during eating in the incisors, which could not be used, as they were embedded in the hood of gingival tissue that covered them completely. From the distance this hood resembled a localized hypertrophy of the gum. Closer examination revealed the hood to be connected with the fully formed teeth and to consist of mucous membrane that covered the incisal edges, reaching the line of the other teeth. The centrals were covered entirely, the left lateral up to its lower third, while the right lateral was free. The surface of this mucous cover was thin and almost transparent anteriorly, somewhat thicker posteriorly, and attained its maximum thickness at the incisal edges. Owing to the intimate contact, the relief of the covered teeth was preserved perfectly, the approximal lines being less distinguishable, and the frenum extending a little lower than normally. The canines and the molars were normal.

Under anesthesia, an incision was made, following the normal gum line, both anteriorly and posteriorly, and the hood was completely removed. A thermo-cautery was passed over the bleeding gum line, affording rapid and perfect hemostasia. The teeth appeared normal, of white color, the free edges were somewhat roughened, but came up to the level of the other teeth. After a week every trace of the incision had disappeared. The histological examination of the hood showed the mucous membrane of the epithelium to be flat on the anterior surface, and revealed a thin coating of fresh connective tissue on the interior surface. The connective tissue cells of the interior surface had much larger nuclei than of the intermediate zone. The portion covering the anterior surface of the teeth was more delicate and less vascular than the posterior one, while the portion at the incisal edges contained mainly connective tissues.

This case is curious, as the alveoli are only slightly elastic, and are easily broken when the incisal edge of a tooth strives to the surface. Troublesome symptoms are sometimes observed in the first dentition in the form of congestion and compression of the gums, which are easily overcome by incisions made at the place where the tooth is to erupt. These

phenomena are, however, not observed in the second dentition, and the eruption of the teeth occurs very easily, especially when the shedding of the deciduous teeth permits the permanent ones to erupt in their proper places. Frequently, to be sure, the eruption of the last molar causes trouble, owing to the narrowness of the maxillary arches and to the layer of the mucous membranes formed over the place which the tooth is to occupy. But neither in the first nor the second dentition are cases observed in which the alveoli are so distended by the erupting tooth as to form a hood. Especially the incisors perforate the alveoli with characteristic ease. An explanation of the case under consideration may be sought in a too rapid shedding of the deciduous teeth, which provoked the closing of the gum by cicatricial tissue, which is hard to pierce and which may have served as a support against the continuous pressure which the erupting teeth must have exerted. Possibly the dental sac may have persisted, preventing the incisors from coming into immediate contact with the alveolar tissue in this indisputably rare case.

[*Revue Trimestrielle Suisse d'Odontologie*, Zurich, No. 1, 1909.]

THERMAL AND ELECTRIC CONDUCTIVITY OF THE PRINCIPAL FILLING MATERIALS. BY CHRISTO KOUSLEFF.

The physical and chemical properties of the various filling materials have been subjected to scrutinizing tests by various authors. The present investigation recommends itself by the thoroughness of the thermal tests and the extensive statistics procured. The thermal conductivity of the filling materials was tested first by itself and then under conditions in fillings approximating the normal. The first series of tests consisted in exposing small cylinders of 8 mm. diameter and 10 mm. height to a constant heat of 100° from a specially designed boiler, the upper surface of these cylinders having been covered with wax, and the time necessary for the melting of this wax being registered by a chronograph. These tests were repeated ten times with each material, the average time necessary for the melting of the wax being as follows: Silver amalgam 9.24 seconds, copper amalgam 9.17 seconds, silicin cement 98 seconds, Ascher cement 102 seconds, Harvard cement 108 sec-

onds; the gutta-percha cylinders became soft to half of their height in about 2 hours, the wax on the surface did not melt. In testing the thermal conductivity of filling materials under conditions in the tooth itself approximating the normal, a molar with an occlusal cavity was embedded in an iron cup filled with mercury up to the level of the filling, and exposed to the same heat as the specimens in the first series. In the fillings an iron pin was inserted in order to conduct the heat, and the pin mounted with a pellet of wax. For the first series of tests, which were repeated five times with each material, the pin extended 1 cm. above the surface of the filling, the average time required for the melting of the wax being for cohesive gold 13.5 seconds, soft gold 16.7 seconds, gold inlays 16.4 seconds, silver amalgam 19.6 seconds, copper amalgam 17.6 seconds, silicin cement 31.6 seconds, Harvard cement 30.4 seconds, Ascher cement 36 seconds. In a second series, in which the pin was extending only 2 mm. above the surface of the filling, the results were as follows: Cohesive gold 4.25 seconds, soft gold 5 seconds, gold inlay 7.8 seconds, silver amalgam 6 seconds, copper amalgam 9.25 seconds, silicin cement 15.5 seconds, Harvard cement 9.5 seconds, Ascher cement 17.5 seconds. Another series of experiments was carried out without a pin, the wax being laid on the surface of the filling itself. The results were as follows: Cohesive gold 15.4 seconds, soft gold 13.4 seconds, gold inlay 25.4 seconds, Harvard cement 28.4 seconds, Ascher cement 37.7 seconds, silicin cement 29.6 seconds. Another series of 8 experiments yielded for gold inlays without cement an average of 21.16 seconds, for inlays with cement 24.62 seconds.

The tests as to electric conductivity were carried out with a galvanometer of the Déprez d'Arsonval system, and showed that cements in a dry state have an insulating action, which is slightly impaired if the cements are wet; gutta-percha is also an insulator. In order to test the metallic materials, the amalgams were packed in a glass tube of 4 cm. length and of 2½ cm. in its lumen; contact was secured by two copper points, and a Thomson double bridge for measuring very feeble resistances was employed. The results were the following: Silver amalgam 0.00282 ohm, copper amalgam 0.00123 ohm. The conductivity of the amalgams approaches that of the pure

metals, lying between that of copper and mercury. The copper amalgam tested was found to be approximately twice as good an electric conductor as the silver amalgam.

[*Deutsche Monatsschrift für Zahnheilkunde*, Berlin, January to March 1909.]

ACTINOMYCOSIS OF THE MOUTH WITH SPECIAL CONSIDERATION OF ITS RELATIONSHIP TO THE TEETH. BY ZAHNARZT H. JAEHN, M.D., Breslau.

The results of these most painstaking investigations may be summed up as follows: The certain recognition and correct diagnosis of actinomycotic disease in the region of the mouth and the jaws is indispensable, on account of its similarity to other pathological symptoms. The road of infection through the carious tooth has been ascertained by a great many investigators, such as Israel, Ponfick, Bollinger, Marleki, Von Bruns, and Partsch. The cases of direct causative origin that have been observed are not sufficiently well established. The conditions in the pulp-chamber and the canals offer no resistance either mechanically or biologically to the entrance and development of actinomyces. The propagation of the germs beyond the apical foramen produces central actinomycosis of the bone only in very rare cases; the clinical progress of the disease is largely analogous to that of an inflammation of the dental periosteum, periodontitis granulosa actinomycotica. There is no swelling of the appertaining group of lymphatic glands in cases of simple infection with actinomyces. The road of perforation outward in form of fistulæ can be traced by way of a tough cord of infiltrated tissue to the culprit tooth. In the area of the posterior teeth generally trismus with a certain width of excursion is noted. The presence of actinomycotic clusters in the pulp-canal has been positively proved, the function of the carious pulp-chamber as one of the portals of entrance for the actinomyces is therefore established. Typical actinomycotic clusters are formed by three constituents: First, irregularly intertwined threads, which represent the center of the cluster; second, radiating threads, which characterize the fungus as a radiating one; third, the club-shaped terminal fibers, generally grouped in clusters, which represent already degenerated forms. The early stages of these clusters are

represented by a texture starting from one point of fine, branching, protoplasmic threads intertwining in coil shape. The hollow globular forms (annular, semilunar clusters of fungi) belong to older patches of radiating fungi. Besides the actinomyces fungi proper, formations resembling them are found in the mouth (also designated as pseudo-actinomyces) which are clearly distinguished from the genuine ones, inasmuch as the complexes of fungi are considerably larger (0.5 to 2 mm.), as over against the genuine ones of 0.01 to 0.2 to 0.75 mm.; the ramification of the threads is missing, the threads themselves are much thicker than in the genuine, and radiate from the beginning, while in the genuine they are irregularly intertwined. Primary attacks of the salivary glands, either of the duct or of the gland itself, have been observed. It has also been proved that the pharynx and the tonsils are important as portals of entrance. The isolated actinomycosis of the tongue shows certain deviations from the normal actinomycosis of the soft tissues (formation of nodules, lack of fistulous propagation, tendency to the formation of circumscribed local areas of granulation). In the central actinomycosis, which is rarely found, similar processes take place as in the disease of the same name in cattle, i.e. on the one hand softening, with the substitution of sarcomatous masses of tissue, on the other an accumulation owing to osseous neoformations.

The therapeutic measures are of conservative surgical nature, i.e. stimulation of a fistulous opening by cataplasms, incisions, curetting, and tampons of iodoform gauze. Similarly to the treatment of chronic periodontitis, certain teeth can be preserved by sterilizing the root-canal with tricesol-formalin and iodine crystals. If the culprit tooth is extracted, the focus of infection at the portal of entrance will be certainly removed. Injections of silver nitrate, tuberculin, etc., have been abandoned; to aid in the treatment potassium iodid may be given internally for some time.

[*La Odontología*, Madrid, February 1909.]
STOVAIN IN ANESTHESIA OF THE PULP. BY J. B. VILIESID.

The disadvantages which the application of arsenous acid presents in devitalizing the den-

tal pulp, especially if the time element enters into consideration, are well known. The author has therefore in some cases ultimately resorted to injections of stovain, always obtaining satisfactory results. Frequently a patient wishes to have a Logan crown put on at one sitting. In such a case the tooth is trimmed down until it becomes very sensitive, the dentin is then slightly touched with a pledget of cotton saturated in a concentrated solution of stovain 5:100, or dressed with powdered stovain which is left on the tooth for from three to five minutes. Gradually the pressure on the cotton is increased in order to obtain superficial anesthesia of the part exposed. Then the needle is inserted into that part of the pulp which is already obtunded, exerting a slight pressure on the tissues and injecting into them the stovain solution. Success depends upon introducing the needle at a speed proportionate to the progress of the anesthesia. The more pressure on the piston is required, and the less fluid is lost by the introduction into the canal, the more quickly and perfectly the anesthesia will ensue. After waiting for two minutes a Donaldson broach is introduced which has been dipped into the anesthetic. If the anesthesia is not complete the injection is repeated, and the needle is introduced until it reaches the painful spot. The canal is then thoroughly cleaned, treated antiseptically, and the crown or filling can be inserted in one sitting without taxing either operator or patient.

[*Deutsche Monatsschrift für Zahnheilkunde*, Berlin, March 1909.]

PUBLIC SCHOOL DENTAL CLINIC AND PUBLIC SCHOOL DENTIST. BY DR. KLEIN, DIRECTOR OF THE MUNICIPAL PUBLIC SCHOOL DENTAL CLINIC AT ULM ON DANUBE.

The author gives a history of the development of public school dental clinics in Germany, and on the basis of his experience and of a very large literary and practical material advances the following principles for the establishing of public school dental clinics, which at this moment seem of interest to American dental practitioners:

(1) The public school dental clinic above all must be an institution for dental hygiene; it must never be allowed to be degraded into a dental polyclinic for school children.

(2) The public school dentist is above all a hygienist, i.e. he must by adequate methods try to produce and preserve among the school children an understanding of a regular dental and oral hygiene, it being proved that this is the best preventive measure against the epidemic increase of dental caries.

(3) These measures for the prevention of caries consist in regular examinations of the teeth of the children and inspection of their dental and oral hygienic habits. (a) The teeth are examined once a year; the children are on this occasion instructed as to the importance of the teeth for the entire organism and as to the necessity of well-regulated dental and oral hygiene. They must receive practical instruction in the care of the teeth. The parents are to be informed of the condition of their children's teeth and admonished to have carious teeth treated in time. (b) Inspections of the children's dental and oral hygienic habits must be held several times a year unexpectedly. Even the teachers should be ignorant as to the date of the inspection, on account of possible influence. The school dentist must examine every child as to the condition of its teeth and its hygienic habits, and must urge the children by praise or blame.

(4) By suitable lectures, to be held in the schools, etc., the school dentist should promulgate the knowledge of dental and oral hygiene in wider circles.

(5) In the school clinic the ambulatory and conservative treatment of children's teeth is instituted in order to offer children of poor parents an opportunity to have their teeth put in good condition. Stress is to be laid on relieving children from toothache in order to render them fit for school instruction.

[*Journal of the American Medical Association*, Chicago, March 27, 1909.]

ETIOLOGY OF FACE, NOSE AND JAW DEFORMITIES. BY E. S. TALBOT.

In his article, Dr. Talbot summarizes the results of his investigations carried on since 1874 concerning the character and classification of deformities of the head, face, jaws, and teeth. In man's evolution certain structures develop and others are lost for the benefit of the organism as a whole. Since the face, jaws, and teeth are undergoing such rapid changes, these are structures with transitory characteristics and are more easily involved in disease than others of the body.

In the development of man from the primitive cell, periods of stress due to readjustment to environment occur. Those which occur during development are called periods of evolution, and those after maturity periods of involution. In man's evolution certain parts disappear for the benefit of the organism as a whole; in the evolution of organisms certain organs disappear. Periods of stress occur when the functions of some organs are lost and those of others are gained by development. The law of economy of growth centers around this struggle of organs or organisms for existence. Because of this fact physiologic atrophies and hypertrophies (arrest and excess in development) occur.

Arrested development of the face nearly always involves the upper jaw. Arrest and excess in development of the nasal bones necessarily result in arrest of both the antero-posterior and lateral development of the face. When arrested development of the face and jaws takes place, the lateral measurement from the outside of the molar teeth is reduced from two inches, which is the average lateral diameter in normal individuals at the present day, down to an inch and one-quarter or an inch and three-quarters in width.

Irregularities of the teeth are seldom inherited. The nature and the character of deformities of the teeth depend entirely on the order of eruption. The eruption of the teeth may be compared to a game of checkers or chess—the first moves on the board decide the game. The method and date of eruption of a few teeth decide the shape of the dental deformity.

Whenever arrest of the development of the jaws takes place there is also nasal stenosis, with atrophies or hypertrophies and deformities of the bones of the nose and mucous membrane. It will be noticed that the two conditions go side by side. Neither is dependent on the other to any marked degree as was formerly supposed, both being the result of an unstable nervous system, and the successful treatment of the one must exert a healthful influence on the other. The development of the nervous system depends on the health of the brain. Any abnormal development of the brain produces abnormalities of the structures of the body. The causes which bring about arrest or excess in fetal development at the first period of stress and which result in degenerates of the vari-

ous classes, are fatigued reproductive organs of either parent, but more especially the mother. Neurasthenia or fagged-out nervous system is due to excess in eating or drinking and to habits, worries, and uncertainties. A common and interesting retrogressive development includes the entire head and face. The forehead recedes from the perpendicular line, and the jaws sometimes protrude beyond the line. This is a return to the lower types of man, and the more marked forms of degeneracy are exhibited in the resultant individual.

The perpendicular line, then, is the dividing line between normal and abnormal facial angle. Deformities of the face, nose, jaws, and teeth rarely require treatment except under conditions where these structures develop inside of the perpendicular line drawn at right angles to a line from the root of the nose to the external auditory meatus.

[*New York Medical Journal*, New York, January 9, 1909.]

THE RELATIONSHIP BETWEEN DENTAL AND SYSTEMIC DISTURBANCES.

BY DR. W. J. LEDERER.

After pointing out the very important relationship between dental and systemic disturbances in facial neuralgia, gingivitis, and odontalgia due to increased blood pressure, the author dwells at some length on the frequent occurrence of toothache during pregnancy, in perfectly sound teeth, which is caused by stasis in expanded pulp-vessels producing pressure on nerve filaments in the pulp. Patients often complain of toothache and painful gums during or shortly before and after the menstrual period, especially about sensitiveness of the teeth to heat and cold. Frequently young women with carefully kept mouths complain of pain in perfectly sound teeth, the probable cause being hyperemia produced by increased blood pressure. Often there is also an increased flow of saliva. The treatment in these cases consists in the local application of tincture of iodine, once a day, and the use of an astringent mouth-wash. If the saliva is acid an alkaline wash is indicated. These symptoms are most frequently observed in young girls about to reach puberty and before their first menstrual period, the symptoms consisting in pelvic discomfort, violent facial pains, radiating to the ear, puffy and loose gums. In many cases

it is advisable to hasten menstruation to reduce the blood pressure. Odontalgia and gingivitis in its various forms are frequently observed during pregnancy, in sound teeth, with inflammatory conditions ranging from a mere gingivitis to periostitis or osteomyelitis with glandular involvement. Extraction in these cases unless absolutely inevitable should be avoided, also long, trying, and painful dental operations. Pulp removal should be postponed if possible; rather some "bridging over" method, such as a gutta-percha filling or cotton and cement dressing, should be employed. If a tooth is beyond saving and is a source of severe constant pain or the cause of infection, it should be removed. If an anesthetic is employed it should be carefully administered in order to avoid clonic spasms. Conservative treatment is of extreme importance during pregnancy not only on account of the altered physiological condition of the patient, but of the acid condition of the buccal secretions, acid eructations and vomiting. Painful dental operations should also be avoided during lactation, as the resultant change in the character of the milk may produce digestive disturbances in the child. If any trying operation cannot be avoided, the child should receive artificial food for twenty-four hours.

Atrophic conditions of the gum, absorption of the alveolar process, spontaneous loosening and final dropping out of the teeth, if not due to old age, may be suspected as symptoms of *tabes dorsalis*. Besides these, painless pulps with profuse hemorrhage, spontaneous suppurative conditions of the maxillæ with necrosis and a sort of drawing facial neuralgia, followed by a sensation as though the teeth were elongated and the gums and lips were swelling, loss of the reflex action of the pupil to light (Argyll-Robertson pupil), and a decreased or abolished knee jerk or Romberg's symptom, are certain dental symptoms of *tabes*.

In diabetes mellitus, the frequent acid reaction of the saliva predisposes the teeth to caries; it is also assumed that considerable fermentation goes on in the diabetic's mouth

owing to the fact that sugar is contained in the saliva. *Pyorrhea alveolaris* is frequently associated with diabetes, and it is a wise precaution to always examine the urine for sugar in all such cases. Some investigators assert that in recent cases of diabetes there obtain small white or grayish papules along the gum, which offer considerable resistance and if removed leave a red bleeding spot. Another buccal symptom is the sour, chloroform-like breath of the diabetic, also the slow process of healing in wounds.

Patients suffering with gout are frequently subject to neuralgia of sudden onset and disappearance. The author believes that too much stress has been laid upon a particularly uric acid diathesis, though gouty states are frequently accompanied by gingivitis in all its forms. The presence of pyorrheal conditions is no more frequently found in gouty conditions than in any other systemic disturbances. There have been found uric acid deposits on the roots of teeth in this condition, which teaches that in treating buccal disease this systemic disorder should be borne in mind.

Gastro-intestinal fermentation is often the cause of interstitial gingivitis, and a careful analysis of the urine will help to ascertain the systemic cause of the condition. This, combined with a blood examination, and an estimation of the hemoglobin, proves invaluable in the recognition of systemic disturbances which cause buccal diseases. The treatment in many cases consists merely in the correction of dietary faults, the administration of cathartics, and the ingestion of water to stimulate excretion of waste materials.

Summing up, in treating buccal conditions which resist local treatment there must be borne in mind, (1) Circulatory disturbances. (2) Nervous disorders. (3) Diseases of nutrition. (4) Infectious diseases. (5) Abnormal physiological conditions. These considerations will often considerably aid in the successful treatment of many conditions that have so far baffled the dental specialist, and will raise the dentist to the standard of stomatologist.

PERISCOPE.

Die Metal.—Bismuth 48 parts, cadmium 13 parts, lead 19 parts, tin 20 parts. This easily fusible metal can be poured into wet plaster. *Zeitschrift für Zahnärztliche Orthopädie.*

To Keep Amalgam Bright.—A simple solution of soda is better for cleansing fresh amalgam than alcohol. The amalgam does not darken afterward and retains a beautiful, pure color.—*Deutsche Zahnärztliche Zeitung.*

To Harden Dentin.—In order to harden partially decalcified dentin somewhat, tannin is mixed with oil of cloves to form a thin paste. This is applied to the soft spot, and the tooth filled with oxyphosphate.—*Deutsche Zahnärztliche Zeitung.*

How to Protect Gold Work from Amalgamation.—Before inserting an amalgam filling in a mouth containing gold, especially if the amalgam is in close proximity to a gold filling or crown, dry the gold work and varnish it with a coat of sandarac varnish.—A. F. DONAHOWER, Philadelphia.

To Keep Nickel-plated Instruments Bright.—To keep nickel-plated instruments bright, wet them and wipe them dry with a cloth which has been allowed to absorb a solution of sodium hyposulfite; then polish with a soft leather.—*Zeitschrift für Zahnärztliche Orthopädie.*

Hollow Inlays.—After preparing the cavity and making the wax model, I mount the model on a sprue and thoroughly chill it. With a fair-sized bur I cut away the wax at those portions where I desire the inlay to be hollow. With moderate care there is no danger of distorting the wax model.—C. A. HINTZ, *Dominion Dental Journal.*

Anesthetizing the Pulp.—For anesthetizing pulps use a solution of cocain mixed with glycerin to a thick plastic consistence. One or two drops of adrenalin chlorid added will prevent hemorrhage. Glycerin is an effective menstruum for cocain, and owing to its great affinity for water is easily absorbed by the pulp tissue.—*Deutsche Zahnärztliche Zeitung.*

Size of Artificial Teeth.—Artificial teeth of the same size as natural ones seem to look larger. But notwithstanding this, teeth are often recognized as being artificial because they are so small. A frequent telltale is the small central and the large lateral. Normally, the lateral is one-third less in width than the central, while in artificial teeth they are often of almost the same width.—*Dominion Dental Journal.*

Selection of Canal Filling.—In the selection of a canal filling the operator should select a filling which should have the following characteristics: It should hermetically seal the apical foramen, be unchangeable by influences surrounding it, non-irritating to soft tissues, readily adaptable to the walls of the canals, and should be at least aseptic, if not antiseptic, when applied.—EDMUND A. DEVINE, *Penn Dental Journal.*

Rubber Plates for Sore Mouths.—In sore mouths plates of black rubber are better tolerated than those of red rubber. If, nevertheless, red rubber is preferred, the particular spot of the model corresponding to the area of irritation is painted several times with a solution of black rubber, and then red rubber is packed. The lingual side of the plate will have a uniform color. The same is done when soft rubber is used.—*Deutsche Zahnärztliche Zeitung.*

A Few Essential Requirements for Cavity Preparation for Porcelain Inlays.—(1) The force and direction of occlusion must be taken into consideration before beginning the preparation of the cavity; then by grooves and angles all the mechanical retention possible without forming undercuts is to be secured.

(2) The walls of the cavity should slightly diverge toward the margins.

(3) The cavity should be as deep as conditions will permit, with the pulpal wall parallel to the plane of the surface on which the cavity is located.

(4) All undercuts must be obliterated, so that the matrix can be withdrawn without distorting it.

(5) Frictional retention must be secured

by having the pulpal wall extend as far as possible without forming undercuts.

(6) Sufficient working space must be secured before beginning the operation.

Unless these essential laws are carried out, only failure can be expected in porcelain inlay work; if the conditions presented will not justify the following out of every one of these principles, some other filling material is indicated.—CHALMERS J. LYONS, *Dental Register*.

Cast-Gold Work.—The method consists in the forming of the wax model for the cast-gold work, then investing, using a quill tooth-pick for a spatula to place the investing material on the wax model.

Use a piece of mechanical saw to draw the model from the tooth, the same to be used as a sprue, or to hold the model while the regular sprue is attached. Use a heated pair of flat-nosed pliers to withdraw the piece of saw from the model, thus avoiding touching the model with the fingers.—F. H. MCINTOSH, *Dental Summary*.

A Method of Repairing Rubber Plates.—This is a simple method of replacing teeth on plates by making grooves and undercuts, and after applying soldering fluid to the pins, flowing Melotte's metal around the pins and filling up the cavity and undercuts flush with the plate. Then polish down even with the plate. The metal is manipulated with a hot spatula.

You will find this method to be quite a time-saver and a more satisfactory means of repair than the old way.—JAMES P. GRAY, *Dental Summary*.

A Tooth Bandage.—In preparing the cavity, simply remove the decay and smooth and bevel the margins. To a piece of No. 36 gage pure gold, sufficient in size to cover the orifice of the cavity, solder a loop staple, or button of gold or platinum for an anchorage. Place the gold over the cavity orifice with the anchorage in the cavity, and burnish the gold to the margins. Finish by contouring with wax and casting in the usual way for large fillings.

For medium and small fillings, contour with crystal gold and melt solder thereon with a mouth blowpipe without investing.—MCFARRAN CROW, *Dental Summary*.

Temporary Stopping for Cavities.—In a sensitive cavity a temporary stopping can be inserted most comfortably by sticking a piece of stopping to the end of a broad flat bur-nisher. Then wipe the cavity as dry as pos-

sible with a pledget of absorbent cotton, and after heating the gutta-percha over the flame plunge it into a bottle of oil of cajaput, and force it into the cavity. The gutta-percha in this way is cooled, thereby avoiding any shock to the sensitive tooth, and the oil having no affinity for moisture, forces the remaining moisture out of the cavity and the gutta-percha adheres to the tooth. This is a valuable aid in treating deciduous teeth.—CHAS. F. ASH, *Odontologist*.

Paper in Dentistry.—A small strip of paper is not to be despised in dentistry. A strip of from five to eight millimeters in length serves for articulating prosthetic pieces and for convincing the patient that all his teeth articulate correctly. If in placing a crown or pivot tooth the patient bites too hard, put a small sheet of paper between the masticating surfaces while you cement in the artificial tooth. Very small strips may further be used for introducing medicaments into a cavity. They may even be left in the cavity as a dressing, especially if the medication be mixed with one of the essential oils, which impregnate and sterilize the paper.—L. JOLY, *Journal Odontologique de France*.

Special Trays for Plaster Impressions in Edentulous Upper Cases.—When taking the first impression a liberal allowance of composition is used in an over-big ordinary tray, the object being to obtain a model which will clearly indicate the various muscular attachments. When casting this model care is taken to make it fairly deep and strong. When it is thoroughly dry and hard, a piece of No. 7 soft sheet metal, as sold with Ash's Rubber-block Swager, is swaged over it between the two soft blocks. This is cut to the size of the finished vulcanite plate, or just slightly larger, and is eventually used as the base-plate for "trying in" purposes. With this in position on the model, a second piece of the same metal is swaged as before between the two blocks, but is cut sufficiently large to allow its free edges, which will occupy the buccal sulcus, to be turned outward for about one-eighth to one-quarter of an inch with a pair of pliers. This constitutes the special tray.

The way in which it is used and the advantages claimed for it are as follows: Plaster, mixed in the usual way, is smeared over the palate and in the buccal sulcus. The tray is filled with no more than sufficient plaster, and gently pressed into place. It is sufficiently rigid to stand the necessary amount of pressure. When partly set the lip and cheeks are drawn outward and downward—

while the tray is held steadily in position—with the object of permitting the more or less sharp turned-out edges of the tray to “grip” the soft tissues of the lips and cheeks, and the fingers are removed from the mouth and the patient is permitted to close the lips. This will be found to be quite sufficient to hold the tray firmly in position, and is much more comfortable for the patient. It is quite easily removed.—W. H. P. BENNETTE, *British Dental Journal*.

Removing Dead Pulp.—When a pulp is entirely dead, greatest care must be exercised in removing it, for there is enough infectious matter in a gangrenous pulp to infect the whole body. If the pulp-chamber is opened with a bur, a piston-like effect is produced by which the infectious matter is forced through the apical foramen. It is therefore best to first rinse with an antiseptic solution, and if necessary, to introduce strong antiseptics into the pulp-chamber. For sealing in such medicaments, cement sufficiently thin so as to be poured into the cavity is used, since gutta-percha or fairly dry cement produces the same piston-like action, which we must avoid.—K. W. KONTING, *Deutsche Zahnärztliche Zeitung*.

Anchorage for Bridge Dentures.—When a molar is selected as an anchorage there is no better support than a well-fitting gold shell crown. When the proper shaping of the surfaces renders the pulp liable to injury and subsequent death, it would be advisable to devitalize and properly treat and fill the canals. If no such injury is liable to occur, the surfaces of the tooth may be treated with silver nitrate just prior to the insertion of the bridge. This same anchorage may be used on the second bicuspid, and in extreme cases, for the required strength of support, on the first bicuspid tooth; the latter, however, is too far forward to afford an esthetic appearance, and in most cases its choice is unnecessary.—ELLISON HILLYER, *Odontologist*.

Cotton Rolls.—Using rubber dam for the smallest operation is a habit which gives considerable pain, owing to the adjustment of clamps and ligatures, and often interferes with certain operations, because of the reduction of space which can be more advantageously used, although, of course, there are many cases in which the dam cannot be spared.

The introduction of various sizes of cotton rolls has been of incalculable value and has done much toward the reduction of unpleasantness inseparable from the use of the rubber

dam, but the great majority of operators are unaware of the still greater possibilities of the rolls, because they have not given them the proper consideration, which also the assistance of various non-irritating clamps and tongue compressors deserves.—W. A. CAPON, *Penn Dental Journal*.

Method of Hemostasis.—In cases of continued hemorrhage after extractions, etc., the blood-clot is removed and an impression is taken with impression compound, the opposite jaw biting as evenly as possible on the impression tray. The overhanging edges of the impression are trimmed off, and the indents left by the teeth present are deepened so that the impression can be conveniently applied and removed. Then a large tampon of cotton is laid on the spot of the hemorrhage, the clot is once more removed and the impression inserted. The patient is directed to bite on the impression, which after from five to ten minutes is removed. This method offers the great advantage that the patient, in case the hemorrhage should recur, can himself insert the impression, for which purpose he may take the impression with him.—Dr. MAENNICH, *Deutsche Zahnärztliche Wochenschrift*.

Crown for Anterior Abscessed Teeth.—The first step in the preparation of a new crown is to open the root-canal and remove all debris, enlarging the root-canal sufficiently to admit a small platinum tube in place of the usual pin. This tube is made of platinum, gage 32 to 38, wound round a wire, the gage of which is selected in accordance with the size of the root; it must be at least large enough to admit the free passage of a broach. The platinum is then soldered with 22-k. gold solder. Next a Richmond cap, or a simple floor of 24-k. gold, is well fitted and burnished to the root and the tube adjusted and soldered to this floor. A facing is then selected of the proper shape and shade, and constructed in the usual way, by allowing the tube to enter through the solder, and by finally cutting it off flush with the solder. The crown is to be well polished.

The application to the root is accomplished by sealing the apex with some easily removable substance, e.g., zinc oxid and eugenol. Then the crown is cemented on in the usual way, by inserting a wire in the tube to exclude the excess of cement. Before the latter is perfectly hard it is well to remove the wire, the apical filling, and any particles of cement which might adhere to the apex. The tooth is then ready to be treated through this opening until cured, when the apex and tube are filled with a suitable root-filling, and a

gold filling is inserted in the lingual opening of the crown. The advantages of this form of crown are very apparent—its adaptability, ease of permanent treatment, the opportunity afforded for access in case of a recurrence—especially if bridge work has been employed—and its efficiency in regard to strength and durability.—SANGER S. CARLETON, *Dental Digest*.

Acid Gargles and Dental Caries.—Gargles containing a certain amount of free hydrochloric acids are sometimes prescribed. In one such case the patient showed a marked and rapid increase of dental caries, from which she had been fairly free theretofore. Mineral acids, even when very dilute, have a decalcifying action on the enamel. A gargle, if used properly, necessitates the liquid being held in contact with the back teeth for some considerable time, much longer than when medicine is swallowed. It is therefore reasonable to suppose that an acid gargle is more injurious to the teeth than an acid draught, since the former cannot be taken through a tube like the latter. Instructions should therefore be given to patients taking any mineral acids into the mouth to promptly rinse the mouth well afterward, preferably with an alkaline solution. In two members of one family who had dosed themselves freely with dilute phosphoric acid as a remedy for colds, considerable caries was noted.—WM. RUSH-TON, *Lancet*.

A Dental Illuminator.—A useful dental illuminator is made by directing a tinsmith to make a tube three inches in diameter and six inches long, and soldering at one end a funnel three and three-fourths inches wide, and capable of accommodating an oval mirror six inches in length when the funnel is compressed. The mirror is fastened in its place by drilling a hole in the wooden frame at each end, and soldering a short wire to the funnel. Slip a short piece of broken duplex spring on the wire before placing the mirror in position, and there will be no wobbling of the mirror when in use. An inch and a half from the rear end of the cylinder cut a hole large enough to allow the socket of a round 16-candle power electric bulb to pass through, and directly under this hole cut another one of about the same size. The light passing through this one will illuminate the cuspidor and its surroundings. The light from the open end of the funnel will afford sufficient light in the mouth of the patient, while the light thrown by the mirror will illuminate the cabinet and bracket quite sufficiently. This appliance is nicely held to the wall

bracket fixture by using the shade holder, and by simply cutting at each side of the screw and bending the piece outward, and cutting a hole in the cylinder, the screws will hold the entire appliance in place, and the electric bulb may be screwed in from the funnel end. The last arm of the bracket should be straight in order to afford the best results.

I have used this for over a year with great satisfaction, as my work and instruments are quite sufficiently lighted, and my own eyes and those of the patient are protected. If the opening toward the patient's face is too large, cut a piece of tin or cardboard to fit, having a smaller opening. I do not use a lens in my illuminator, never having been able to procure one suitable, and I do not think it to be necessary. The total cost of tinsmithing and mirror was sixty-five cents. The side of the funnel facing the cabinet is to be cut away.

I sincerely hope others may find this useful. The care of one's eyes is very essential, and the light one uses is certainly most important.—FRED. W. BADGLEY, *Dominion Dental Journal*.

The Retention of Lower Plates by Atmospheric Pressure.—In order to secure retention by atmospheric pressure for a lower plate, first see that the jaw has no undercuts; if there are any, they should be removed surgically. When the alveolus is thoroughly healed the impression may be taken in the following manner, wherein the secret of securing retention lies. As a material for taking the impression I use modeling compound.

After finding a tray of the proper size and shape for the case in hand, take a little more material upon the tray than for an ordinary impression—this is to prevent the necessity of the tray coming in close contact with the tissues, which would cause an uneven compression of the soft parts.

While the impression material is quite soft, place it in the mouth and press it down about three-quarters of the distance which you desire it to go, then stop and hold it there steadily until it cools a little. During this interval I have my assistant use a little rotary fan in the dental engine, directing the cold air upon the impression material; this chills the outer layer of the material and keeps it from flowing away from the tissue when the second pressure is put upon it. I usually wait about one or two minutes for the first cooling, or until it takes five or ten pounds of pressure to force the material down one-eighth of an inch farther, then hold it again very steadily with about one-half the amount of pressure which was required to

force it down the last time, until the impression is quite hard. Remove and chill in cold water and pour immediately.

If this method is followed out carefully, the denture being made upon this model in the ordinary way, you will find when the plate is put in the mouth that it will stick, because in taking the impression the soft compressible tissues at the point where the margin of the plate comes, as indicated by the line on the model, were compressed uniformly, and the plate having the corresponding tightness along the border, when pressed down in the mouth seals itself in the soft tissues by preventing the air from getting in under its margins.—D. H. YOUNG, *Dental Brief*.

To Prevent Strangling During Extraction.—When extracting a tooth or performing a surgical operation in the mouth, just when the patient is fairly well under the influence of the general anesthetic, put the finger on the base of the tongue, bring it forward, and place a large roll of cotton two to three inches long across the base, just forward of the epiglottis; the tongue will not drop back and no blood or débris will get back of the cotton. If the operation is a long one, change the cotton as often as necessary by drawing one end of the roll forward and passing a fresh one into its place. If this is done until the patient has regained consciousness sufficient to expectorate, no blood will trickle down the throat to be thrown up afterward, or worse still, get into the trachea to cause strangulation. Nor is there any danger of a tooth or root slipping out of the forceps and going down the throat, thereby causing the operator to suddenly develop a case of nervous prostration.—F. H. SKINNER, *Dental Register*.

Relief Areas in Plates.—I have recently tried to relieve pressure on hard spots in the roof of the mouth by dusting powdered gum arabic on thin rubber dam which is first cut to the shape of the hard spot. I then place this dam on the natural gum where relief is needed. The moisture on the gums will soften the gum arabic and cause it to adhere to the roof of the mouth. The rubber is permitted to extend only to about one-fourth of an inch from the edges of the plate.

I take a plaster impression right over the dam, which comes away with the impression. It is then taken out of the impression before the model is poured. This makes a thin relief that follows the outline of the mouth, and can be placed exactly where it is wanted, which is impossible to do by merely relying

on scraping the impression or building up the model.

I have used this method but a few times, but so far it has worked well. It is necessary in almost every case to cut a V in the dam to smooth out wrinkles or folds. I believe that thin cloth would do just as well as rubber, and would be easier to adapt.—O. H. SIMPSON, *Western Dental Journal*.

Sectional Inlays.—Sectional inlays are used only in cavities of extreme shape, where the caries has attacked the tooth to such an extent that it becomes necessary to retain all the solid tooth-structure that is left. Take an approximal cavity in a large molar, involving the occlusal angle, the diameter of which is bucco-lingually much larger at the cervical than at the occlusal portion. The cavity is so large bucco-lingually at the cervical portion that in order to prepare a solid or one-piece inlay, it would be necessary to cut down a considerable portion of good solid tooth-structure. To avoid this, the sectional inlays or two-piece inlays are employed. These inlays should be made hollow by carving the wax inlay or by the use of suction and heat. I have been using a suction apparatus that is now on the market, and while it is a great improvement over the carving it is quite crude. This defect will undoubtedly be overcome as the evolution of casting gold progresses in dentistry. The orifice of the hollow cavities should be so carved that when the two sections are in place, the cement will form one solid mass, running from the hollow in one section to the hollow in another.—ALBERT L. LE GRO, *Dental Register*.

Advantages of Short Broaches in Removing the Pulp from the Mesial Canals of Lower Molars, etc.—One should prepare the broach by either cutting an ordinary barbed broach, leaving the barbed end one and one-eighth of an inch long, or purchasing short broaches that are made of the proper length.

Roughen the large end or hold it in the flame to take out the temper slightly at this point only, then bend it over into a hook with pliers. On this hook or rough end build a small sealing-wax handle.

Use these short broaches in removing pulps from the mesial canals of lower molars, also from other canals where a longer broach would have to be bent unduly in rotating; use them by rotating between the thumb and forefinger.

One can thus obviate the usual cause of breakage, *i.e.* bending, and can remove the pulp more painlessly, quickly, and effectively.

and also avoid the rough broach handle commonly used, which is liable to abrade the lips or cheeks. One is also dispensing with an instrument that is very seldom rendered antiseptic, as it is a difficult task to sterilize a broach handle.—H. L. GRAHAM, *Garretsonian*.

Gold Fillings.—With a cavity correctly prepared, moderate sized pieces of gold should be condensed along a line angle from one point angle to an opposite one, which will securely anchor the first portion of the filling between two opposite walls. The gold can be adapted by two methods—shingling and wedging.

Shingling consists in building up the gold in the angle in the form of a prism, letting each fresh piece of gold extend over the wall of the cavity slightly beyond the gold already condensed. The angle of force should be toward the line angle at the base of the prism. It should not be directly at right angles to the plane of the wall being covered. The wedging principle of adapting gold to cavity walls consists in starting the condensation of a fresh piece of gold at the center of the gold already condensed, and stepping the plugger toward the wall of the cavity, the gold next to the wall being the last to be condensed. As it is wedged between the wall and the already condensed gold, perfect adaptation results. A thin layer of gold cannot be adapted to a cavity wall.—H. E. FRIESELL, *Dental Summary*.

The Chemical Composition of Teeth.—Gassman has made a chemical analysis of human and of dogs' teeth, in order to ascertain whether there is any considerable difference in their composition. The results, which are recorded in the *Zeitschrift für Physiologische Chemie*, 1908, vol. lv., p. 455, are given in percentages in the following table:

Human Teeth—	Water.	Loss on calcination.	Calcium.
Canines	8.09	22.20	29.78
Deciduous	3.76	22.84	29.59
Third molars...	6.91	18.33	31.65
Aged persons...	8.17	21.42	30.25
Dogs' teeth.....	10.97	25.99	27.33

These figures show that human teeth contain more calcium than those of the dog, and the third molars, which are richest in calcium, contain nearly 5 per cent. more than is present in dogs' teeth. The loss due to calcination affords an approximate indication of the amount of organic matter present. It will be noticed that whereas dogs' teeth are the richest in organic matter, human third molars are poorest in that respect. The quan-

tity of phosphoric acid is proportional to the calcium present. Human teeth are richest in chlorin and the salts of potassium, whereas in dogs' teeth the salts of sodium predominate. It is noteworthy that the third molars, which are the most prone to decay, are relatively rich in calcium and poor in organic matter.—*British Dental Journal*.

To Replace a Broken Facing.—In repairing a broken facing much trouble is very often experienced in drilling into the gold holes which will accurately fit the pins of a tooth. The weakness of the support can readily be seen when, the first holes having been drilled incorrectly, others must be drilled in the same region. The suggestion offered will certainly be of much help in obtaining accurate points of anchorage in the gold for the pins of the porcelain facing.

Select your tooth of proper shape, size, and shade, and back it up with thick No. 60 tin foil, just as in backing with gold. Then grind the pins of the old facing flush with the backing, upon which the tin-foil pattern is placed. With a pencil mark on the gold the points corresponding to the holes in the tin foil, and drill through. The pins of the facing will pass through perfectly, and little trouble is experienced in fitting.

The advantage of this procedure is that we can adjust our tin foil, which corresponds to the back of the tooth, exactly where we want it, unhampered by the pins. There is no guesswork attached to it. It is a certain method with a certain result.—MAX HILLEL FELDMAN, *Odontologist*.

Alloys and Discoloration of the Teeth.—The different alloys are influenced by the metals used. In an amalgam made of an alloy in which tin is used in a reasonable per cent., the amalgam will mix more readily and set quicker; if zinc predominates there is danger of galvanic action; in legitimate quantities this metal controls shrinkage; copper is said to exert an antiseptic influence. In the use of amalgam great care should be taken to have the cavity thoroughly dry, as moisture assists in the discoloration of the tooth-structure. The discoloration of teeth that have been filled with amalgam is due to compounds of sulfur or oxygen; either of these elements acting upon the amalgam would form a dark salt or compound, either the black sulfid or the oxid of silver, or the mercurial salts, the dentin being stained and presenting an unsightly appearance. In bleaching the tooth to do away with the stain the result is gained by the oxygen of the hydrogen or sodium dioxid combining with the hydrogen of the

salt; this breaks up the union between the metal and its base, the former is set free and readily washed away.—B. B. BENNETT, *Dental Digest*.

An Abutment.—The abutment suggested consists of an inner gold cone and a solid gold crown cast to fit over and be secured to this by a small screw. To make the inner cone the tooth is reduced as little as possible, the apices of the root-canals are sealed, and the pulp-chamber is shaped to a cup-like depression. Into this No. 60 gold foil is pressed, the overlap not extending to the periphery of the root. A piece of copper wire is forced through the matrix into the canals only so far as will allow of its being removed when waxed in position. With the matrix and copper wires and the wax in position, a plaster impression is taken of the root, and from that the hollow gold cone is made.

The fused cone is boiled in nitric acid, which dissolves the copper and leaves the holes in the desired position. Three small pins of gold or dental alloy wire are made to pass into the roots. This cone is cemented in position, and while the cement is soft the pins are pushed through the holes, making all secure. The gold crown is made to fit this fixed cone, a hole being tapped through both crown and cone. The crown is sealed into position with chloro-percha, the screw being tightened into place.—H. W. P. BENNETTE, *British Dental Journal*.

Cavities Involving the Incisal Edge.—Ordinarily the most difficult matrix to form without tearing is one for step cavities. But by carefully carrying out the following instructions it will be found very simple, and in the step where folds are so annoying there will not be a wrinkle.

In shaping the orange-wood stick, one side, the end, and one edge are used. Over this the platinum is shaped, again bending the edge of the platinum back in the form of a flange, in order that it may pass freely between the teeth. Place the platinum in the cavity, and pack with cotton and burnish it carefully into the deep portion of the cavity, being careful not to permit the platinum to fold over on the labial surface. It should stand perfectly parallel with the labial margin. With a pair of cotton pliers gradually bend the matrix into the step. With a flat burnisher adapt it closely to the labial wall and in the step, then with the same burnisher carry the surplus on the labial wall to place. Next carry the approximal portion of the step to place, and finally fold back the portion covering the gingiva of the step. This fold in the

platinum stops at the cavo-surface angle, consequently it does not interfere with the adaptation of the inlay. Burnish over the lingual margin carefully and use the rubber band.—A. W. STARBUCK, *Dental Summary*.

To Repair a Hole in a Crown.—It often happens that we have to repair holes in gold crowns; also while repairing the perforation we are very prone to burn the rest of the crown. Again, in the process of repair, the crown may lose all its shape and usefulness. To repair a crown quickly and surely, the following method is recommended:

Fill the inside of the crown with modeling compound, cutting off the excess which passes through the hole. If the hole is large, trim the compound to the form and contour necessary, allowing for the thickness of the gold to be used. Cut off a piece of gold plate or backing No. 36 gage, and of a size large enough to cover the area to be repaired. Place the crown in the swager, adjust the piece of gold in position, cover it with a piece of rubber dam, and swage with moldine. After the piece of gold is swaged the outline of the perforation is clearly seen. Then trim off the excess, remove the modeling compound from the crown, apply the piece of swaged plate to the opening in the crown, and solder in the Bunsen flame.

This method of repairing does not occupy much time, requires the least bit of solder, is sure to produce perfect union, and finally, restores the original contour of the crown.—M. A. GOTTLIEB, *Odontologist*.

X-Ray Diagnosis in Disease of the Antrum.—Disease of the antrum is usually recognized by its symptoms or by transillumination, but the X rays will also show tumors or fluid in the antrum, and sometimes they give information of the cause of the trouble that cannot be obtained by any other methods. Foreign bodies, such as drainage tubes or roots of teeth that have slipped back into it, are easily seen. The fangs of molar, bicuspid, or canine teeth may project into it and become eroded. Fillings of these roots have been known to pass through the ends and cause irritation. Of the other rarer conditions, exostosis of the roots is one that may give rise to severe and obscure symptoms. They may cause pressure troubles of adjacent teeth, and these may easily be mistaken for the offenders. They are frequently multiple, and all the diseased teeth must be discovered and extracted to effect a cure. Absorption of the roots of permanent teeth sometimes occurs, and it is as well in these cases to discover the teeth that will have to be ex-

tracted and inform your patient to that effect. Occasionally, also, you may require the aid of the rays to diagnose enamel nodules between the roots, dentin nodules in the pulp-cavity, warty teeth, polypus of the pulp, and salivary calculi.—C. J. MORRIS, *British Dental Journal*.

Intra-Nasal Application of Cocain for Anesthesia of Upper Incisors and Canines.

—First, apply with a pledget of cotton on an applicator a 1:1000 adrenalin chlorid solution to the mucous membrane of the nostril on the side corresponding to the teeth which you wish to anesthetize. The purpose of this is to contract the bloodvessels and thereby prevent undue absorption of the cocain solution and reduce the possibility of constitutional disturbances to a minimum.

After waiting five minutes take a pledget of cotton about half an inch in diameter saturated with a ten per cent. solution of cocain hydrochlorid, squeeze out any superfluous amount, and insert the cotton into the nostril and let it rest on the nasal floor between the septum and the anterior end of the inferior turbinate, tucking it well up under the turbinate and around the anterior end of the same.

The patient should then be instructed to sit with his head thrown forward, in order to prevent any of the solution from passing backward and being swallowed. In twenty minutes, if your technique has been correct and the anatomical conditions are favorable, the anesthesia will have reached its maximum, and if the cotton is then removed, will last for about thirty minutes longer. The cotton should be removed before the work is begun on the teeth on account of the position of the head and consequent danger of swallowing the cocain.

It must, of course, be borne in mind that there are some patients who have an idiosyncrasy toward cocain, and the operator should always be prepared to meet this condition should it be present.—GEORGE VIAL SCHRAMM, *Western Dental Journal*.

Osmic Acid Injection for the Relief of Trifacial Neuralgia.—Germain remarks that in considering the subject of trifacial neuralgia one is struck by the diverse conditions said to be the cause of the disease. These cases may be divided into three great classes: (I) Neuralgia as a symptom of some general

disease; anemia, diabetes, etc., where there are usually definite nerve changes; neuritis. (II) Reflex intermittent pain due to some local cause, as a carious tooth, sinus disease, etc. (III) True epileptiform neuralgia, to which neither true cause nor favoring conditions can be assigned. It is the latter condition which we are called upon to treat surgically sooner or later in its course. The chief features of this true major neuralgia are well summarized by Hutchinson: (1) It is almost invariably unilateral. (2) It commences in the second or third division of the fifth nerve and tends to involve both. (3) The first division is involved to a much less degree. (4) Attacks of pain are paroxysmal or spasmodic and tend to increase in severity, with shortening intervals of freedom from pain. (5) During each attack there is usually spasm of the facial muscle of the affected side. (6) The subjects of the disease are usually adults between the ages of thirty and fifty. (7) Its progress is one of increasing severity. (8) Medical treatment has little or no effect. (9) Operations on peripheral branches give temporary relief. Partial or complete removal of the Gasserian ganglion usually cures. It has been common experience that nerve stretching, nerve section, and avulsion of the whole nerve according to the method of Thiersch is followed by relief from pain for a longer or shorter period of time. All of these procedures are followed by regeneration of the peripheral nerve and recurrence of pain. The period of relief varies from three months to two years, but is almost never permanent. Of late years certain injection methods have been in vogue, notably osmic acid injection and injection of alcohol. Germain has used a two per cent. solution of osmic acid injected directly into the nerve trunk in eleven cases. He believes that osmic acid injection will relieve trifacial neuralgia for a longer or shorter period of time. Relief from pain is not immediate, but follows in a few days after injection. It may be followed by a certain amount of necrosis of tissue at the point of injection, and it is little if any better than other peripheral operations. It is best used in a two per cent. solution injected directly into the nerve, using a glass syringe and a platinum needle, and it should be used only in purely sensory nerves, as its employment in mixed nerves is followed by motor paralysis.—*New York Medical Journal*.

HINTS, QUERIES, AND COMMENTS.

BILATERAL NECROSIS OF THE MANDIBLE.

THE patient, N. N., a lad of fifteen, presented for examination complaining of little

Left side: Necrosis affecting both permanent molars and the anterior border of the ramus, also the apices of the roots.

Both sequestra were completely denuded of periosteum, the gum being practically sep-

FIG. 1.



Right.

Labial aspect.

Left.

pain, but stating that his teeth were troubling him, especially at meals. Examination showed that both sides of the mandible were necrosed to the extent now to be described.

arated from the rest of the maxillary bone. It will be seen that the second bicuspid on the right side is missing, the patient having removed it some time previously with his

FIG. 2.



Left.

Lingual aspect.

Right.

Figs. 1 and 2. Right side: Necrosis affecting the two bicuspid and first permanent molar down to the apices of the roots, which may be clearly seen in the photograph.

fingers, it being so loose. He had also removed in the same manner the first permanent molar on the same side, but as he had kept it, I replaced it in the specimen.

On extraction of these sequestra there was little flow of blood, but two days later the patient returned with profuse hemorrhage from the left side due to traumatism in masticating. After several pressure applications of tampons saturated with a 1 to 1000 solution of adrenalin the hemorrhage was stopped, and the patient dismissed after having been cautioned.

The cause of this extensive necrosis was a severe attack of typhoid fever from which the patient suffered about eighteen or twenty months before, and he declares that previous to his illness he never had any dental trouble of any kind. The molars are free from caries but show resorption of their apices caused by the necrosis of the mandible. A curious feature of the case was its appearance in the mouth, both sequestra looking (except for their color) like artificial dentures. Fig. 1 represents the labial aspect, Fig. 2 the lingual aspect. Both are of natural size.

CECIL R. COWPER.

Buenos Aires, R. A.

HOW TO POUR MELOTTE'S METAL OVER METALLINE.

To secure perfect results from the use of Metalline you must first paint your cusp with glycerin; this being a dehydrating substance, it takes up all the moisture that might be conveyed from your fingers to the Metalline; it also prevents the latter from sticking to your metal.

Your cooling-block should be a piece of metal from one-half inch to an inch thick, covered with a smooth piece of writing paper; the paper prevents the rapid congealing or draining away of the metal. Do not have your metal too hot, but just above the melting-point. When you begin to pour your metal, hold the cusp in place with an old

hatpin or any sharp-pointed instrument, gradually pulling it out as you fill up your ring. I have found from experience that the S. S. W. formula of Melotte's metal gives the best results.

There is no reason why everybody should not have perfect results from the use of this wonderful time-saver.

F. B. DAMRON, D.D.S.,

Prof. of Prosthetic Dentistry.

Dental College, Lincoln, Nebr.

A METHOD OF MAKING A QUICK AND PERMANENT VULCANITE REPAIR.

In cases where a tooth or block is to be replaced, saw out a dovetail, coat the dovetail with a rubber solution made by dissolving a piece of dental rubber in chloroform, then fit the tooth or block to place and pack with Hood & Co.'s "waxable vulcanite," which, as its name implies, is manipulated with a warm spatula around the pins and into the dovetail just like a piece of wax.

Invest the piece in the flask with one pouring, and vulcanize. In cases of this kind there is no need of pouring a model; all the above may be done on the base-plate. In cases of fractured plates or of very thin ones, upon which a tooth is to be replaced, a model must be poured in the beginning; then proceed as above.

I always keep a large flask on hand in case two or three plates are to be repaired; I pack them by this method and invest all in one flask.

Perfect results are attained, with the saving of much time if compared with the old way of waxing up, investing, pouring the other half, burning out the wax, etc.

L. C. HOLLAND.

Suffolk, Va.

OBITUARY.

DR. CYRUS NEWLIN PEIRCE.

DIED, at his home, 3316 Powelton ave., Philadelphia, on Sunday, May 16, 1909, after an illness of over three months due to the infirmities of advanced years, CYRUS NEWLIN PEIRCE, D.D.S., in his eighty-first year.

Dr. C. N. Peirce was born March 5, 1829, at Byberry, now embraced in the city of Philadelphia, Pa. His father, Cyrus Peirce, was of Chester county, Pa., and his mother, Ruth Sargent Peirce, of Portsmouth, New Hampshire. Dr. Peirce from his early boyhood was accustomed to severe and continuous labor on a large farm, being thus employed until he was of age. His education was obtained from the best schools in the locality during the unoccupied months. After reaching his majority he went to New York Central College, located in Cortland county, New York, remaining here something over a year and maintaining himself by carpenter work while pursuing his studies, this being a manual labor school made this possible to do. On returning home in June with health broken from a severe case of typhoid fever, as soon as recuperative forces would permit he went to Girard College as prefect, where, during a stay of six weeks, he decided to make dentistry his profession. On the 15th of October 1851 he entered the laboratory and office of Dr. Franklin M. Dixon, then practicing at the northeast corner of Seventh and Buttonwood sts., Philadelphia, where he remained as student and principal for twenty-one years, with the exception of a few weeks. During his pupilage, single, pivot, and block teeth by the hundred were carved and burned by him. From the first day of proprietorship a living practice was enjoyed, and from this it rapidly grew to be profitable.

The Philadelphia College of Dental Surgery having been established in 1852, he became a student therein and was graduated in 1854. In 1858 he was elected a professor in the Pennsylvania College of Dental Surgery, this college being the successor of the Philadelphia College of Dental Surgery, and

in 1860 was elected to the office of dean, which position he held until 1866, when he retired from the school and gave his undivided time to his professional duties. In 1877 there was a reorganization of the Pennsylvania College of Dental Surgery, when Dr. Peirce was again elected to a professorship and at the same time made dean, which position he held until he retired from the school as an active professor in 1901, having held a professorship for thirty-two years and the office of dean for nearly thirty years, and having been in the practice of dentistry for fifty years including the period of pupilage.

For forty years of his active career he was closely associated with the Woman's Medical College of Pennsylvania, being all of this time a member of the board of corporators and a member of the executive committee during its existence with the exception of a few months, and secretary of the board for thirty-nine years. In this institution he also lectured for fifteen years, supplementing the course by giving instruction on diseases of the mouth and teeth.

Dr. Peirce contributed many papers on dentistry and allied subjects. Some of the more important were—"Low Forms of Life Found in the Oral Cavity;" "Development of Permanent and Deciduous Teeth;" "Origin of Pyorrhea Alveolaris;" "Function, its Evolution and Influence on Organization;" "Function, its Influence on Structure;" "The Third Molars;" "Comparative Anatomy of the Teeth;" "Some Thoughts on Transformism;" "Characters of Human Structure—Extracting Teeth;" "Immobility of the Jaws;" "Deciduous Teeth, their Eruption and Removal;" "Affections of the Teeth," etc.

He was a life member of the Academy of National Sciences, the Historical Society, and the Philosophical Society of Philadelphia, a member of the American Association for the Advancement of Science, the American Dental Association, and the several local dental societies; in most of these he had enjoyed the honors at their disposal.

Dr. Peirce was endowed by nature with qualities which eminently fitted him for leadership, and his versatility of mind and interests, controlled by a ripened judgment, made him conspicuous as a man of affairs. His love of science brought him into relationship with the membership of the representative scientific societies in Philadelphia when their deliberations were graced by some of the most brilliant intellects of that period. In these scientific bodies, particularly that of the Academy of Natural Sciences, Dr. Peirce was no lay figure, but an active participant in and contributor to the discussion of the class of problems in natural science and biology that interested and enlisted the intellectual activities of such men as Joseph Leidy, Edward D. Cope, Harrison Allen, John Ryder, and others of similar mental greatness. These associations ripened and developed the mind of Dr. Peirce and found their reflex in his teachings both as a contributor to the literature of dentistry and as instructor to his classes. He was thus a pioneer in the movement which has since been an uplifting scientific force in our profession.

Physically frail, his nervous energy and his active and progressive mind made him a power in whatever he undertook. His knowledge of finance caused him to be sought as a trust officer in one of our large trust companies, and he was variously identified with several important business enterprises.

He was the champion of women in their contention for equal educational and other rights, and a tireless and energetic advocate of equity and right in dealing with all questions both public and private. No man of his day gave more freely of his time and intellectual wealth to the welfare of his profession, and when the history of American dentistry is fairly written the name of Cyrus Newlin Peirce will not be found among the least of its benefactors.

DR. FREDERICK WILLIAM SCHLOENDORN.

DIED, in his fiftieth year, at his home in Baltimore, March 5, 1909, FREDERICK WILLIAM SCHLOENDORN, D.D.S.

Dr. Schloendorn was born at Bad Rehburg, in Hanover, Germany, on January 22, 1860. The inspiration for his life-work he received

from his father, a family physician of the old type, who amid an agricultural and farming population spent a life of self-sacrifice for the sick and the poor. The financial returns were by no means commensurate with the size and responsibilities of his practice, and he accepted part payment in the coin of love and gratitude. His second son, Frederick William, was endowed with a wonderfully deft hand; in his father's absence he frequently bandaged a wound or set a broken limb, his mother's table linen not being considered too precious in emergencies. He dreamed of becoming a surgeon, but circumstances led his life into different channels. An early opportunity was offered in the field of dentistry; he became the assistant of Dr. Flörke in the city of Bremen. Flörke's magnetic personality impressed the young man, who quickly acquired his master's mechanical skill and remembered his ways of dealing pleasantly with the many varieties of mankind. During those years, Dr. Schloendorn also completed his term of military service, which he enjoyed from beginning to end. Physically one of the strongest men in his company, he was a skilled athlete, and was also possessed of musical talent.

Wishing to learn the methods of American dentistry, Dr. Schloendorn came to the United States in 1888, and entered the department of dentistry of the University of Pennsylvania. In the following year he changed to the University of Maryland, and was graduated from there with the class of 1889. A number of beautiful specimens of his work were presented to the museum of that institution.

Dr. Schloendorn had intended to remain in Baltimore for but a short time before returning to Bremen, but his immediate professional success, the advice of friends, and finally his marriage induced him to locate permanently in that city. A number of very difficult operations in surgical dentistry quickly gained for him the esteem of physicians of the Johns Hopkins Hospital and University. In the treatment of teeth, especially in the filling of root-canals, he showed originality and proved the courage of his convictions. His particular specialty was crown and bridge work, and in this department he may be regarded as the pioneer of Baltimore, who in the face of opposition

and doubts proved convincingly the permanent value of this innovation in modern dentistry. In his earlier years he executed every mechanical detail with his own hands, and later on, when his practice grew so that he was compelled to engage two assistants, he still studied and watched every detail. Every piece of bridge work that left his office was a masterpiece. He combined expert mechanical skill with the touch of the surgeon and the finish of the artist. He loved his work, breathed his soul into it, and inspired those about him.

He was of fine physique and impressive personality, and his friends will ever remember his good-fellowship, his buoyancy, and his fairness toward the attainments of others. He passed away in the prime of life, not only beloved by his family, his colleagues, and his numerous friends, but also admired by his profession. The gods loved him, and he died young.

DR. WALTER FRANKLIN FUNDENBERG.

DIED, in Atlantic City, N. J., November 22, 1908, WALTER FRANKLIN FUNDENBERG, M.D., in the eighty-first year of his age.

Dr. Fundenberg was born in Chambersburg, Pa., November 25, 1827, the son of Dr. Daniel Fundenberg of Lewiston, Md., who was descended from Freiherr (Baron) Walter Von der Burg, whose descendants settled in Maryland in 1627. Dr. Fundenberg's mother was Rebecca Fahnstock, daughter of Peter Fahnstock and Hannah Studebaker.

Dr. Fundenberg with his mother moved to Pittsburg in 1835. He received his education in the University of Western Pennsylvania, now University of Pittsburg, studied medicine and dentistry with his brother-in-law, Dr. S. P. Hullihen of Wheeling, W. Va., and was graduated from the University of Maryland at Baltimore in the year 1850, with the degree of doctor of medicine. He took up the practice of dentistry and oral surgery.

In 1855 he was appointed aide-de-camp, with the rank of lieutenant-colonel, by Governor James Pollock. Later in the same year he received the appointment of surgeon from the Czar of Russia, but on his way to the Crimea he learned in Paris that peace between Russia and the allies was declared.

Dr. Fundenberg served in the Civil War as surgeon of the One Hundred and Thirty-sixth and One Hundred and Seventy-sixth Pennsylvania regiments, and was a member of the Loyal Legion. He was a member of the American Medical Association, of the Allegheny County Medical Society, of the American Dental Association, and of several other kindred organizations. In religion he was a Presbyterian, having been a member of the Third Church, Pittsburg.

Dr. Fundenberg married Miss Lida Cox, daughter of Judge Josiah Cox of Somerset county. She died early, leaving three children, two of whom, Dr. Walter H. and Dr. Edwin C., survive their father. They have been associated with him many years in the practice of dentistry. Later he married Miss Mary Cox, sister of his deceased wife. She, with two children, Dr. Charles Fundenberg and Mrs. J. C. Childs of New York, survives him.

Dr. Fundenberg, besides having attained prominence as one of Pittsburg's eminent professional men and acquiring a lucrative practice, was untiring in his efforts to advance his profession, ever ready to extend a helping hand. For many years it was his habit to call upon all members of his profession commencing to practice in his city and endeavor to enlist their interest in professional work. His many acts of encouragement will long be remembered by those remaining, and his labors and high ideals will serve as an example to others as to what one can do to uplift his profession.

DR. THORNTON W. TOMLINSON.

DIED, in his seventy-fourth year, in his office in Charlestown, W. Va., January 10, 1909. THORNTON W. TOMLINSON, D.D.S.

Dr. Tomlinson in experience and years of practice was one of the oldest dentists in his state. He was a native of Charlestown, where he acquired a liberal education. In 1858 he was graduated from the Baltimore Dental College, and practiced his profession for a time in Baltimore and in New York, finally returning to Charlestown. Here he devoted himself for nearly fifty years to the conscientious practice of his beloved profession, enjoying all that time the reputation of a thoroughly equipped, practical, and skil-

ful dentist. It was in his office, in which he spent one-half of his life, where he was found dead, peacefully sitting in a chair, having evidently been stricken while he was engaged in reading.

Dr. Tomlinson took a keen interest in public affairs, and possessed a fund of information which he lavishly placed at the disposal of his friends. He entertained firm convictions about public affairs and measures, and was richly supplied with data to support his manly and fair views. In his profession Dr. Tomlinson ranked among the best. The high esteem in which he was held by his colleagues was evidenced by his election to the presidency of the first state dental board of examiners created by the governor of West Virginia, which position he held for some years.

Dr. Tomlinson was never married, and the only members of his family surviving him are three sisters, Mrs. Geo. H. Turner and Miss Orra F. Tomlinson, both of Charlestown, and Mrs. Luke C. Strider of Washington. Interment was made in Edge Hill Cemetery.

DR. AMERICUS V. BARDEEN.

DIED, at his home in Hamilton, N. Y., March 7, 1909, from paralysis, AMERICUS V. BARDEEN, D.D.S., in his eighty-second year.

Dr. A. V. Bardeen was one of the fathers of his profession, and long before the days of the D.D.S. or of the scientific equipment of the modern dentist managed a dental college in his office. He made many of his own instruments. He was a cunning "smith" in all the metals, inventive and dextrous, a sort of lightning operator. Dr. Bardeen was a close student, who intelligently welcomed all the innovations in his rapidly progressing science, devouring and thoroughly digesting the current dental literature. He was strong in dental surgery, often performing swift and skilful operations in acutely desperate cases. He had an intuitive gift of divination for the basal cause of troubles, and was rarely baffled.

He was the son of Cyrus and Sarah (Wilbur) Bardeen, and was born at Brookfield, N. Y., on October 31, 1827. He received his early education at Clarkville (N. Y.) Academy. After being graduated he secured the

aid of dentists of New York city for the training of himself and his brother in all dental processes. He entered dental practice in 1849 at Hamilton, N. Y.

On October 22, 1856, he was married to Cornelia Campbell, at Hamilton, N. Y., who together with two daughters, Mrs. Rev. A. W. Bourne, Auburn, N. Y., and Mrs. Rev. C. H. Watson, Arlington, Mass., and one son, Dr. Wallace Bardeen, Hamilton, N. Y., survives him.

Dr. Bardeen was an old-time gentleman, most considerate in manners, gentle in spirit and speech, in life above reproach, delighting in every man's good work, and never hurting a human heart.

Interment was made at Hamilton, N. Y.

DR. NELLIE B. FRENCH.

DIED, in her forty-fifth year, at her home in Fort Wayne, Ind., March 14, 1909, Dr. NELLIE B. FRENCH.

Death terminated a brilliant professional career and took from earth a gifted woman of fine personality and lofty character when Dr. Nellie B. French, one of the leading dental surgeons of Fort Wayne, Ind., died of pneumonia at her home, 215 West Superior street.

Miss French was born at Dayton, Ohio, on June 3, 1864. She came at an early age to Fort Wayne, Ind., with her parents, the late Mr. and Mrs. Samuel French. She was educated in the schools of Fort Wayne, and in 1889 entered the dental office of Dr. S. B. Brown to take up the study of dentistry. She gave to her professional work most assiduous and intelligent attention, and her progress was rapid. Dr. Brown having passed away in 1897, she continued the practice under his name, after having successfully passed in June 1897 the state board examination.

In her profession, Dr. French always occupied a markedly high rank, and was once honored by the presidency of the Isaac Knapp Dental Coterie, a local organization of dental surgeons of Fort Wayne, Ind. She was in addition a member of the Indiana State Dental Society, and gave the whole force of her marked capability to her professional work. Her methods were progressive

and her career was a continued effort toward advancement. Her offices were equipped with the latest and best appliances, and her practice was both extensive and lucrative. Her personality was blended with the loftiest attributes of heart and mind, and her character won and retained for her universal regard and esteem.

Dr. French was a member of the Trinity English Lutheran church. She is survived by a brother, George E. French, and three sisters, Mrs. Lillian F. S. Stouder, Mrs. E. S. Young, and Mrs. A. B. Jackson. Interment was made at Lindenwood, the pallbearers having been selected from the ranks of the dental fraternity—Dr. S. B. Hartman, Dr. E. W. Dodez, Dr. R. S. Viberg, Dr. H. H. Meier, Dr. T. C. Wyneken, and Dr. J. S. MacCurdy.

The Fort Wayne, Ind., Isaac Knapp Dental Coterie adopted the following *In memoriam* resolutions upon the death of Dr. French, as reported to the society by Drs. H. H. Meier, S. B. Hartman, and M. A. Mason, the committee on resolutions:

MEMORIAL AND RESOLUTIONS.

For the second time death has levied tribute on the membership of the Isaac Knapp Dental Coterie. The first call of the Reaper was for that well-known citizen and pioneer of dentistry, Dr. Seneca B. Brown; the second has been for his faithful, conscientious, competent student, Dr. Nellie B. French, who succeeded him in the practice of dentistry in the office so long occupied by him as a dentist and by her as a student.

Dr. French was recognized by the dental profession of the city and state as a faithful, conscientious, competent, and thorough dentist, and enjoyed the highest respect of all its members for the lady-like qualities she possessed. We admired her courage to enter a calling where so few of her sex seek employment, and the indomitable will and ceaseless perseverance which enabled her to overcome the obstacles which confronted her in acquiring a knowledge of dentistry. None ever sought to do more thorough work, or imparted more genuine sympathy in those operations where pain could not be avoided.

She was not content with her learning, but was progressive and was ever on the alert to add to her store of knowledge, and to increase her sphere of usefulness by the diligent study of up-to-date literature and by faithful attendance at many of the clinics given by the best skill and talent of the pro-

fession at the state and national dental meetings.

Dr. French joined the Isaac Knapp Dental Coterie shortly after she was licensed to practice dentistry and continued an active and faithful member up to the time of her death, doing her full share in contributing papers and relating her experiences and observations on methods of practice. As a presiding officer of the coterie she proved herself competent and progressive, and saw to it that during her presidency the society made no retrogressive movement.

Therefore, be it

RESOLVED, That in the death of our member we acknowledge the loss of one who had been faithful to the best of her ability; and be it further

RESOLVED, That a copy of this memorial be spread upon the book of records of the Isaac Knapp Dental Coterie, a specially prepared copy be tendered the family, and a copy be offered each of the three daily papers.

"IN MEMORIAM" RESOLUTIONS.

Dr. Alison W. Harlan.

THE following resolutions were passed at the meeting of the American Dental Society of Europe, held at Wiesbaden, April 12, 1909:

Whereas, through the sequelæ of an unfortunate accident, there has been removed from our midst our co-laborer and respected friend and member, Dr. ALISON W. HARLAN, of New York, U. S. A., be it

RESOLVED, That in his death there has been taken from us, at the zenith of his usefulness, one of our most regular contributors and efficient workers, a staunch friend of science, and one of the brightest and most companionable members of our profession; and be it

RESOLVED, That in his demise dentistry has lost one of its most able instructors and the younger members of our profession one of their most reliable guides and truest friends; and be it

RESOLVED, That the American Dental Society of Europe, in the death of our brother and colleague, hereby deplores its irreparable loss, and respectfully tenders its sympathy to his widow and children in their sad bereavement; and that this expression of our feelings be conveyed to them by our secretary, and that a copy of the same be inscribed in the minutes of our deliberations, as a per-

manent record of our love and respect for our departed brother.

W. MITCHELL,
I. B. DAVENPORT,
W. M. GRISWOLD.

At a meeting of the Odontological Society of Chicago the following resolutions were adopted:

Whereas, through the death of Dr. A. W. Harlan the Odontological Society of Chicago has lost its founder and a former president, one who has been most actively connected with the society for twenty-five years, whose

vigorous personality won for him the respect, admiration, and love of his colleagues; therefore, be it

RESOLVED, That the members of the Odontological Society of Chicago express their profound sorrow at the loss of their associate, and extend heartfelt sympathy to the bereaved family. And be it further

RESOLVED, That these resolutions be spread upon the minutes of the society, that a copy be furnished to the dental press for publication, and that a further copy be transmitted to the family of the deceased.

J. W. WASSALL,
C. N. JOHNSON,
W. V-B. AMES.

DENTAL COLLEGE COMMENCEMENTS.

ROYAL COLLEGE OF DENTAL SURGEONS OF ONTARIO.

THE annual commencement exercises of the Royal College of Dental Surgeons were held in Toronto, Ont., April 30, 1909.

An address to the graduates was delivered by A. C. McKay, LL.D.

The diploma of Doctor of Dental Surgery was presented by R. A. Falconer, president of the University of Toronto; the certificate of Licentiate of Dental Surgery was presented by Dr. G. C. Bonnycastle, president of the Royal College of Dental Surgeons, on the following graduates:

Joseph Elmer Amos
Webster John Armstrong
William Allan Armstrong
Frederick Barron
Franklin Alvin Blatchford
George Forbes Brebber
James Murray Cation
Emory Albert Clark
Wilbur Harvey Coon
Rupert Hugh Cosgrove
William Arnold Cowan
John Nelson Dunning
Gordon Armstrong Elliott
Ralph Waldo Emerson
Robert Elward Fisher
Reginald Wilson Frank
George Ernest French
Milton John Gibson
Thomas Howard Graham
Thomas Norman Guy

Frederick Gower
Hart Vincent Egerton
Mildred Hanna
Garnet Tiffany Ives
Carmen Borden Johnston
John Logan Kappelle
Harold Edgar Klingner
Duane Charles Locke
James Joseph Lonergan
Fred Stanley Loucks
William Walter Mills
Charles Howard Moore
Frank Homer Moore
Stanley Roy Moore
Robt. Matthew Macfarlane
Howard James MacLaurin
John Archibald McArthur
Calvin Seaberth McComb
Geo. Marshall McElhinney

C. Walker McIntyre
Russell Malcolm McLean
Kenneth McLeod McVey
Martin James O'Callaghan
Harry McLaughlin Peaker
Albert Harold Pratt
Wilfred Johnston Preston
Harvey Alexander Robb
Hugh Arnold Semple
Elmo Wesley Sisson
Charles Norman Simpson
Royal Elgin Stewart
Robert Duncan Sloane
Edgar Linton Thompson
Robert James Vance
Ernest Claude Veitch
Robertson Roy Walker
Carl Vivian Wallace
Robert Sidney Woollatt

SOUTHERN DENTAL COLLEGE.

THE annual commencement exercises of the Southern Dental College were held in the Grand Opera House, Atlanta, Ga., April 29, 1909.

The degree of Doctor of Dental Surgery was conferred on the following graduates:

George B. Ash	J. Rosco Hendley	Collier K. Ray
Clifford B. Ayer	Lewis K. Hutchinson	Henry A. Smathers, Jr.
William J. Bacon	James K. Hunt	Ben C. Smathers
William D. Ballenger	Frank J. Kimsey	William C. Smith
Johnson H. Baker	H. Leonidas Keith	Henry Hix Sizemore
Dawson A. Brown	John R. Lister	J. Bennett Stapleton
John R. Brooks	G. Pierce McElreath	Jerome T. Smith
W. H. Branch	Robert Lee McManus	Homer Vanzandt
Lloyd H. Darby	E. A. May	Vivian M. Waters
Omer L. Dunn	Hal J. Miller	Sampson Williams
Leroy W. Denham	Thadious Morrison	Fred H. Wallis
Marvin C. Duncan	Robert H. Price	William M. Willis
Henry C. Fike	Eugene M. Rackley	

WESTERN DENTAL COLLEGE.

THE nineteenth annual commencement exercises of the Western Dental College, Kansas City, Mo., were held on Saturday, May 8, 1909, at the Central High School Auditorium.

The annual address was delivered by Luther Freeman, D.D.

The degree of Doctor of Dental Surgery was conferred by D. J. McMillen, M.D., D.D.S., on the following graduates:

James Raymond Acton	Alonzo Charles Eyman	Leighton B. Morris
Taylor S. Adams	George Artford Farris	William Talbutt Neale
Jesse Moore Asbury	John T. Hand	William Hugo Nieman
Hose G. Bertenshaw	John H. Hanna	Ole C. Olsen
Virgil Lee Brooks	Waller Wesley Harrell	Adrian Carso Ragan
Fred Elmer Byers	Nicholas T. Henderson	Roy Brooks Redd
J. William Chiles	Chas. J. Hood	Miller Wootson Rice
Roy J. Cochran	Dee M. Hunter	Robert M. Smiley
Amil Blake Cockrum	Ira Jay Jones	Reason C. Tharp
Fred Arthur Crume	Alexander S. Lehman	Reuben C. Turner, Jr.
John Cottier Curtis	Raymond R. McCloughan	Rudolph M. Weber
William Thomas DeJarnett		

KANSAS CITY DENTAL COLLEGE.

THE twenty-eighth annual commencement exercises of the Kansas City Dental College were held in the First Presbyterian Church, Kansas City, Mo., May 7, 1909.

Addresses were delivered by Rev. Frank S. Arnold and Dr. Chas. C. Allen.

The degree of Doctor of Dental Surgery was conferred by Dr. John Deans Patterson on the following graduates:

Connell Valard Alexander	Samuel Edward Gillman	Clyde Melvin Roush
William Earnest Beggs	Warren Darst Gill	Albert Franklin Sewart
Samuel Baker Bohon	Sidney Nelson Hedrick	Ewald Frederick Stanke
Francis Marion Bowman	Dorsey Earl Hooper	Harry Franklin Suffield
John G. Buchner	Walter Leabo	Eugene Thille
Rudolph Henry Buttner	James William McKinney	Gustav Julius Tretbar
Hubert Leon Doolin	Ray Arthur Maddox	Ralph Edgar Welch
James J. Dufner	Roy Wroughton Parmenter	Alpheus Clay Withers
Kennith Porter Dunaway	John Payne	John Sheldon Wright
Edgar Glick Fulton		

VANDERBILT UNIVERSITY, DENTAL DEPARTMENT.

THE annual commencement exercises of the Dental Department of Vanderbilt University were held in Nashville, Tenn., on Saturday, May 8, 1909.

An address was delivered by Dr. John M. Moore.

The degree of Doctor of Dental Surgery was conferred by Chancellor J. H. Kirkland on the following graduates:

Jas. Allen	Arkansas	H. M. Nix	Alabama
C. M. Battle	Tennessee	W. M. Porter	Tennessee
Edgar Butler	Louisiana	C. L. Reeves	Louisiana
E. P. Byers	Arizona	C. R. Roberts	Washington
John Byrd, Jr.	Tennessee	C. B. Rosson	Kentucky
W. T. Chapman	Alabama	H. H. Simmons	Mississippi
H. S. Davis	Tennessee	W. E. Simms	California
W. W. Earthman	Tennessee	J. N. Sledge, Jr.	Alabama
W. L. Ellis	South Carolina	W. B. Smith	Mississippi
Luther Evans	Arkansas	E. R. Stone	Missouri
Connie Finch	Arkansas	E. W. Taylor	Tennessee
J. B. Giddens	Alabama	A. L. Thompson	Washington
A. M. Gowan	Mississippi	D. R. Thompson	Arkansas
A. G. Grizzard	Tennessee	S. E. Watkins	West Virginia
R. E. Hawkins	Mississippi	E. F. Watson	Texas
E. H. Howell	Arkansas	J. K. Williams	Mississippi
S. H. Leslie	Arkansas	J. H. Winstanley	Oregon
Z. C. Mims	Alabama	W. L. Yarbrough	Texas
Y. Nishimura	Japan	L. Zelaya	Central America

BALTIMORE COLLEGE OF DENTAL SURGERY.

THE sixty-ninth annual commencement exercises of the Baltimore College of Dental Surgery were held in Albaugh's Theatre, Baltimore, Md., on Tuesday, May 18, 1909.

The annual oration was delivered by W. W. Parker, Esq., and the valedictorian was J. F. Barton.

The degree of Doctor of Dental Surgery was conferred by the dean, Prof. M. W. Foster, on the following graduates:

J. F. Barton	Connecticut	E. J. Lawler	Virginia
W. H. Baish	Maryland	J. F. Lang	Ohio
M. A. Bane	Connecticut	C. W. Leps	West Virginia
R. Blanes	Porto Rico	J. E. Libby	Maine
C. A. Celestin	Louisiana	C. V. McCormick	Iowa
J. F. Cleveland	Canada	H. G. McElroy	New Jersey
A. H. Coffin	Canada	H. Martin	Massachusetts
T. F. Cummings	Connecticut	F. L. Mason	Rhode Island
E. L. Cunningham	Rhode Island	G. T. Masters	Louisiana
H. L. Desmarais	Massachusetts	C. N. Mims	Florida
G. L. Despiau	Porto Rico	J. A. Moran	Connecticut
O. J. Dennehey	Connecticut	W. E. Morgan	Vermont
J. F. Dunn	Massachusetts	C. L. Pegues	Alabama
H. L. Fischer	Connecticut	H. E. Pratte	Massachusetts
B. E. Flanders	Maine	E. A. Randall	Rhode Island
C. L. Goetz	Maryland	F. H. Richardson	Massachusetts
P. F. Harrington	Massachusetts	H. C. Schaner	Pennsylvania
A. E. Hennegar	Nova Scotia	P. L. Small	Connecticut
S. J. Holt	New Hampshire	F. P. Sullivan	New York
J. H. Hollihan	Massachusetts	A. B. Thurston	Missouri
H. S. Hursh	Ohio	A. A. Verret	Louisiana
A. F. Jenkins	Maryland	C. U. Voils	North Carolina
M. S. Jenkins	Virginia	F. C. Wainwright	New York
A. Kahn	New York	M. J. Welch	Massachusetts
J. P. Kirwin	Massachusetts	W. H. Wheeler	Maryland
J. A. King	Maine	A. C. Wingrove	West Virginia

OHIO COLLEGE OF DENTAL SURGERY.

THE sixty-third annual commencement exercises of the Ohio College of Dental Surgery were held at the Odeon, Thursday, May 13, 1909, at 8 P.M.

Addresses were made by Rev. Edmund A. Neville and Leonard F. Meyer. Prizes were awarded and remarks made by the dean, Prof. H. A. Smith.

The degree of Doctor of Dental Surgery was conferred by Hon. Herbert Jenney, president of the board of trustees, on the following graduates:

J. Nelson Banks	Virginia	Charles S. McDowell	Nebraska
Charles E. Chase	New York	Hugh Marshall	Ohio
Napoleon A. Cunningham	Ohio	Clyde N. Maxey	Kentucky
Ira L. DeHaas	Ohio	Leonard F. Meyer	Ohio
John A. DeJarnette	Kentucky	Clarence A. Miller	Ohio
Frank G. Dupuy	West Virginia	Charles W. Noel	California
Paul W. Dustin	Ohio	Cornelius E. Pryor	Ohio
Edgar E. Galbreath	Germany	W. Frank Rule	Ohio
Joseph A. Haas	Ohio	Robert E. Shelton	Ohio
Frank A. Hale	West Virginia	James H. Shireliff	West Virginia
Hal L. Heck	West Virginia	Fred C. Snowberger	Indiana
Henry S. Hefner	West Virginia	Arthur B. Thompson	Ohio
Fred E. Hess	West Virginia	Math O. Van Stronder	Ohio
Jeff C. Hoskinson	Ohio	Standard B. VanVleck	West Virginia
Fred C. Jackson	Indiana	Llewellyn B. Walters	Ohio
Chester M. Jenkins	West Virginia	Howard G. Withers	Indiana
Ralph R. Kelsey	Ohio	Armin E. Wulfman	Ohio

STARLING-OHIO MEDICAL COLLEGE, DENTAL DEPARTMENT.

THE second annual commencement exercises of the Dental Department of the Starling-Ohio Medical College were held in Columbus, Ohio, at the First Congregational Church, Tuesday, May 18, 1909.

An address was delivered by Rev. Dr. Washington Gladden, and remarks were made by President W. O. Thompson. The class oration was delivered by R. R. Bode.

The degree of Doctor of Dental Surgery was conferred by W. O. Thompson, president of the board of trustees, on the following graduates:

John C. Archer	Carl William Emmert	George Lynn Moore
Joseph Mitchell Bell	Harold Burl Ford	Nathan Ernest Riekey
James Arthur Black	Amplius Menninger Galvin	Carl Jay Seib
Roy Roland Bode	Charles Russell Gantz	Edward Comin Spear
King Arthur Bosworth	Charles Morton Gray	Charles Christian Strader
Rutherford Hayes Bowsher	Ralph Myrick Hann	Mirl Hoffman Stukey
Stevens William Brown	Otis Uleric Knechtley	Norwood Anthony Thorne
Earl Granville Clark	Arthur Theadore Knoderor	George Kay Tolford
Sperry B. Claypool	Richard Earl McCray	Pren Foster Walker
Harry Stewart Cowden	Vernon Hilborn Michener	John Ralph Weimer
James Edward Cushwa		

Fifth International Dental Congress.

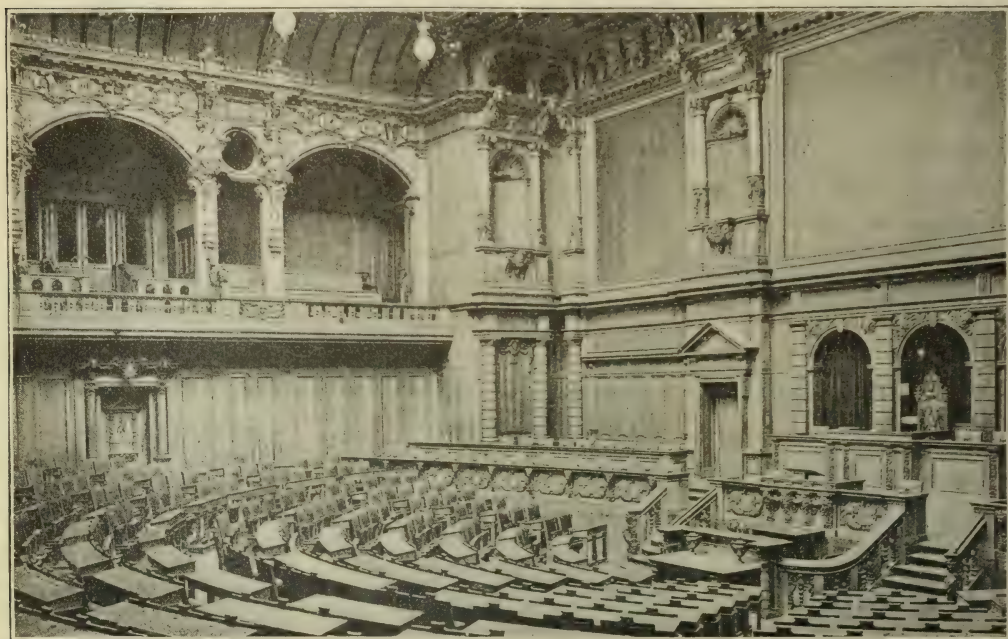
Berlin, Germany, August 23 to 28, 1909.

OFFICIAL COMMUNICATION FROM THE COMMITTEE OF ORGANIZATION.

Invitation.

TO our colleagues of all nationalities we hereby extend a hearty invitation to participate in the FIFTH INTERNATIONAL DENTAL CONGRESS, to be held

invited the congress to meet in Berlin in 1909, the German dentists were greatly pleased at the unanimous acceptance of their invitation.



GRAND ASSEMBLY-ROOM, REICHSTAG BUILDING, WHERE THE GENERAL SESSIONS OF THE CONGRESS WILL BE HELD.

in Berlin, August 23 to 28, 1909, in the Reichstag building.

When at St. Louis in the year 1904 the highly appreciated and respected Professor W. D. Miller, as president of the Central-Verein Deutscher Zahnärzte,

The congress will be coincident with the fiftieth anniversary of the Central-Verein Deutscher Zahnärzte. The united German dental profession is therefore preparing to worthily celebrate this occasion, and to make the theoretical and

practical results of this congress stand out as a landmark in the development of dental science.

Colleagues of all nations will combine, and in friendly rivalry giving and taking, learning and teaching, demonstrate to the educated world what great progress the science of dentistry has made in recent years.

Through well-attended meetings at which representatives of all nations will discuss theoretical and practical problems, dentistry will prove itself an independent science, worthy of being regarded as one of the numerous intellectual achievements of mankind.

The German Organization Committee, selected by the F. D. I., the Central-Verein, and the Vereinsbund, have completed their preparations, and now appeal to all colleagues, both at home and abroad, for their esteemed support.

The Reichstag building offers ample space for the meetings of the congress, which is divided into twelve sections. The Berlin Local Committee will do everything possible to entertain the visitors in the German metropolis during the time not occupied by more serious pursuits.

An International Dental Exhibition, to which the members are earnestly invited to contribute, will in the widest sense demonstrate the progress of our profession.

Honorary Presidents of the Congress are: Geheimer Medizinalrat Prof. Dr. Waldeyer; Wirklicher Geh. Ober-Reg.-Rat, Ministerialdirektor Dr. Naumann; Geheimer Ober-Medizinalrat Prof. Dr. Kirchner, and Geheimer Ober-Medicinalrat Dr. Dietrich of the Kultusministerium.

An Honorary Committee is also to be chosen.

The German Imperial Government has decided that the governments of the nations represented shall be officially informed of the meeting of the International Dental Congress in Berlin.

Besides the meetings of the individual sections, the congress will hold two general sessions. At these meetings time will be found not only for lectures and demonstrations, but also for the discussion of subjects of general interest proposed by the chairmen of the sections. All progress in scientific, technical, and operative dentistry, as well as the subject and development of dental hygiene, will be presented by the ablest authorities.

A meeting of the F. D. I. will take place at the beginning and at the end of the congress.

Colleagues,—With your united support, may the great work succeed! The invitation is most heartily given by your German colleagues. With our united strength, let us guide our profession to still greater success, for the honor of science, for the benefit of mankind.

WALKOFF, *President*,
SCHAEFFER-STUCKERT,
Secretary-general,

COMMITTEE OF ORGANIZATION OF THE FIFTH
INTERNATIONAL DENTAL CONGRESS.

To the President of the National Committee of the United States of America for the Fifth International Dental Congress, Berlin, Dr. EDWARD C. KIRK, Philadelphia.

Dear Doctor,—I herewith beg to transmit through you the hearty invitation and preliminary program of the German colleagues to our American *confrères*. The Committee of Organization has been very happy to be informed of the constitution of the National Committee of the U. S. A., containing so many valuable and prominent men, and we hope that you will succeed in bringing about a participation of American dentists in the Berlin Congress as extensive as possible. We can assure you that the German colleagues will be happy to welcome their American brethren to Berlin, and that international science and international

SECTION III: Chemistry, Physics, and Metallurgy. *Chairman*, C. Birgfeld, Hamburg, Alsterdamm 1.

SECTION IV: Diagnosis and Special Therapeutics; Materia Medica. *Chairman*, Prof. Dr. Michel, Würzburg, Wilhelmstr. 3.

SECTION V: Oral Surgery and Surgical Prosthesis. *Chairman*, Geheimrat Prof. Dr. Partsch, Breslau, Kaiser-Wilhelmstr. 3; Prof. Dr. Schröder, Berlin, Rankestr. 27.

SECTION VI: General and Local Anesthesia. *Chairman*, University Lecturer Dr. Fischer, Greifswald.

SECTION VII: Operative Dentistry. *Chairman*, Prof. Dr. Sachs, Berlin, Kurfürstendamm 247.

SECTION VIII: Prosthetic Dentistry, including Crown and Bridge Work; Ceramics. *Chairman*, Prof. Dr. Riegner, Breslau, Museumstr. 11.

SECTION IX: Orthodontia. *Chairman*, Hofzahnarzt Heydenhauss, M.D., Berlin, Potsdamerstr. 121A.

SECTION X: Hygiene of the Mouth and Teeth. *Chairman*, Hofrat Dr. C. Röse, Dresden, Daheimstr. 12.

SECTION XI: Education and Legislation. *Chairman*, Dr. Ritter, Berlin, Königgrätzerstr. 94.

SECTION XII: History and Literature. *Chairman*, University Lecturer Dr. Hoffendahl, Berlin, Schöneberger Ufer 20.

(3) "Ordinary members" of the congress are: Graduated dentists, who possess the diploma of the country in which they practice, and instructors of dentistry in universities. "Associate members" of the congress are: (a) Physicians; (b) foreigners, who do not possess the diploma of the country in which they reside. (The eligibility of persons not here provided for will be decided by the national committees; for Germany, by the Committee of Organization.) "Participants" are relatives of the members of the congress, and students of dentistry. Ordinary and associate members have equal rights.

(4) Applications for membership are to be sent to the national committees (in Germany, to the Organization Committee), together with name and address, and the fee of 25 marks. For relatives of the members of the congress, as well as for students, the charge for admission cards will be 10 marks.

(5) For admittance to the congress, a card bearing the name of the member, as well as a receipt for the dues paid, is necessary.

Visitors at the congress will receive the Daily Journal of the congress and the catalog of the exhibition. Ordinary and associate members receive the Transactions of the Congress, gratis.

Lectures and demonstrations can be given by members only.

(6) The congress will convene in the Reichstag building.

(7) German, English, and French are the official languages of the congress; other languages may be used with the consent of the chairman of the section.

(8) The congress will hold a general opening session (Monday, August 23, 1909), a general session (Thursday, August 26th), and a closing session (Saturday, August 28th). There will be sessions of individual sections, as well as meetings of several sections together. Discussions will not take place at the opening session.

(9) Those wishing to give lectures, demonstrations, etc., should notify the chairman of the section, before May 15, 1909. Notices sent in after that date can be considered only after the program has been arranged. Should circumstances permit of more papers being read, the chairman has a right to select from those sent in after May 15th. It is advisable to let the national committees send in all contributions, etc., to the chairmen of the different sections.

(10) All lectures, etc., are to be delivered ready for printing in the language in which they are to be given, with a summary of the most important points, to the chairman of the section not later than June 15, 1909. This summary will be translated by the management and placed before the members of the section.

(11) Notice of practical demonstrations should be given to the chairman of the section as soon as possible, together with a list of accessories necessary for the demonstration. A short account of the purpose of the demonstration should be sent to the chairman before June 15, 1909. This account will be translated, and communicated to the members of the congress.

(12) The time at the disposal of a lecturer is fixed at twenty minutes; five minutes will

be allowed for speeches in the discussion. Extension of the time is left to the judgment of the chairman.

(13) Those taking part in the discussions should immediately note their remarks on a printed form, and give it to the secretary, if they wish their views to be published in the Transactions of the Congress.

(14) A pass for the various social functions will be issued at the price of 12 marks.

(15) There will be an International Dental Exhibition connected with the congress.

PROVISIONAL PROGRAM.

The following provisional program has been arranged:

SUNDAY, August 22d.

Meeting of the Fédération Dentaire Internationale. Evening: Reception of the guests at the Reichstagsgebäude.

MONDAY, August 23d.

Morning: Opening session. After the official address of welcome, four orators (German, English, French, and American) will speak on subjects chosen by themselves and important for the entire profession. The National Committees of the respective countries have each been requested to nominate their orator.

Evening: Reception given by the City of Berlin at City Hall.

TUESDAY, August 24th.

9 A.M.—2 P.M.: Sessions of the Sections.

Evening: Banquet in the halls of the Zoological Gardens.

WEDNESDAY, August 25th.

9 A.M.—2 P.M.: Sessions of the Sections.

Evening: Fiftieth anniversary of the Central Verein Deutscher Zahnärzte (Central Association of German Dentists) in the halls of the Rheingold.

THURSDAY, August 26th.

Second general session in the great hall of the Reichstagsgebäude. Subjects and questions will be discussed by speakers appointed by the different countries.

Evening—at the disposal of the congressists.

FRIDAY, August 27th.

9 A.M.—2 P.M.: Sessions of the Sections.

Evening: Reception in honor of the congressists given by the *confrères* of Berlin and of the province of Brandenburg.

Special train to Wannsee.

SATURDAY, August 28th.

9 A.M.—12 M.: Sessions of the Sections (passing of resolutions) and meeting of the Fédération Dentaire Internationale.

3 P.M.: Closing session. Adoption of the resolutions of the Congress.

Evening: Farewell banquet at the Halensee Terraces.

On Sunday and after, groups of the congressists will visit German cities and universities.

INTERNATIONAL EXHIBITION OF DENTAL SCIENCE.

IN connection with the Fifth International Dental Congress in Berlin, August 23–28, 1909, an International Exhibition of Dental Science will be arranged, on a large scale, in the Reichstag building.

The progress of dentistry in all civilized countries cannot be better illustrated than by means of a systematically arranged scientific exhibition.

The nature and extent of the proposed exhibition is evident from the following grouping:

GROUPS OF EXHIBITS.

I. Anatomy and physiology.

1. Comparative anatomy. (a) Anthropology and ethnology. (b) Comparative odontology including paleontology. (c) Anomalies of the teeth of animals.

2. Normal macroscopical anatomy of man (anatomy and development of the head, jaws, and teeth, including specimens of the jaws and teeth).

3. Normal microscopical anatomy.

4. Anomalies of anatomical development (anomalies of the development of the head, jaws, and teeth).

5. Physiology.

II. Pathology and bacteriology.

1. General pathology.
2. Special macroscopical pathology, including comparative pathology.
3. Special microscopical pathology.
4. Bacteriology of the mouth.

III. Surgery of the mouth and the jaws.

1. Surgical therapeutics, including narcosis and local anesthesia.
2. Surgical prosthesis, including obturators.

IV. Orthodontia.

V. Preservative treatment of the teeth.

1. Fillings. 2. Root-treatment.

VI. Prosthetic dentistry.

1. Plate work. 2. Crown and bridge work, including ceramics.

VII. Photography in dental surgery as a means of investigation and instruction.

1. Macroscopic photography. 2. Microscopic photography. 3. Stereoscopy. 4. X-ray photography. 5. Photography in colors.

VIII. General dental education, post-graduate instruction, educational appliances.

IX. Hygiene of the mouth and the teeth.

- (a) From the scientific, and (b) from the sociological point of view.

X. History of dentistry.

Instruments, pictures, and in short, everything of historical interest for dentistry.

XI. Dental jurisprudence.

XII. Literature.

- (a) Original works. (b) Periodicals.

The committee desires to be informed of the names of all public or private collections containing specimens of general or special interest for dentistry.

The committee of the exhibition urgently requests each to use his personal influence to arouse interest in behalf of the International Dental Exhibition.

The committee will take every possible precaution to insure the safety of any specimens loaned.

Prof. Dr. DIECK,

Chairman Committee on Exhibits,
Berlin, Potsdamerstr. 113, Villa 3.

AMERICAN NATIONAL COMMITTEE FOR THE FIFTH INTERNATIONAL DENTAL CONGRESS.

At a meeting of the Executive Council of the National Dental Association held at Pittsburg, Pa., Saturday, October 10, 1908, the following were appointed as the American National Committee, to forward the work of the Fifth International Congress and provide for the representation of American dentistry at that congress—to be held in Berlin, Ger., August 23 to 28, 1909:

American National Committee.

Edward C. Kirk, Philadelphia, Pa., *Ch'man.*
Burton Lee Thorpe, St. Louis, Mo., *Sec'y.*
Truman W. Brophy, Chicago, Ill.
S. H. Guilford, Philadelphia, Pa.
B. Holly Smith, Baltimore, Md.
G. E. Savage, Worcester, Mass.
Wm. Carr, New York, N. Y.
W. W. Walker, New York, N. Y.
J. D. Patterson, Kansas City, Mo.
Gordon White, Nashville, Tenn.
Chas. R. Turner, Philadelphia, Pa.
Chas. McManus, Hartford, Conn.
G. V. I. Brown, Milwaukee, Wis.
N. S. Hoff, Ann Arbor, Mich.
F. E. Ball, Fargo, N. Dak.
L. P. Dotterer, Charleston, S. C.
Eugene H. Smith, Boston, Mass.
Chas. L. Alexander, Charlotte, N. C.

COMMITTEE ON ESSAYS.

Edward C. Kirk, *Chairman.*
Burton Lee Thorpe, *Secretary.*
L. P. Dotterer.

COMMITTEE ON CLINICS.

Wm. Carr, *Chairman.*
J. D. Patterson, *Secretary.*
Chas. L. Alexander.

All Americans who expect to attend the congress are requested to send their names, with the title of their essay or clinic, to the secretary of the American National Committee at once.

BURTON LEE THORPE, *Sec'y,*
3605 Lindell Blvd., St. Louis, Mo.

SOCIETY NOTES AND ANNOUNCEMENTS.

DENTAL SOCIETY MEETINGS:

June, July, and August.

JUNE.

AMERICAN MEDICAL ASSOCIATION, SECTION ON STOMATOLOGY. Atlantic City, N. J. Four days: June 8th to 11th.

FLORIDA STATE DENTAL SOCIETY. Ocala. Three days: June 17th to 19th.

GEORGIA STATE DENTAL SOCIETY. Cumberland Island. June 1st to 3d.

INDIANA STATE DENTAL ASSOCIATION. Indianapolis. June 29th to July 1st.

MAINE DENTAL SOCIETY. Portland. Three days: June 24th to 26th.

MASSACHUSETTS DENTAL SOCIETY. Boston. Three days: June 9th to 11th.

MICHIGAN STATE DENTAL SOCIETY. Kalamazoo. Three days: June 29th to July 1st.

MINNESOTA STATE DENTAL ASSOCIATION. Minneapolis. Three days: June 22d to 24th.

NEW MEXICO DENTAL SOCIETY. Albuquerque. Two days: June 17th and 18th.

NORTH CAROLINA DENTAL SOCIETY. Asheville. Four days: June 23d to 26th.

OKLAHOMA STATE DENTAL SOCIETY. Oklahoma City. Three days: June 3d to 5th.

PENNSYLVANIA STATE DENTAL SOCIETY. Pittsburgh. Three days: June 29th to July 1st.

SOUTH CAROLINA STATE DENTAL ASSOCIATION. Glenn Springs. Five days: June 28th to July 2d.

SOUTH DAKOTA STATE DENTAL SOCIETY. Huron. Three days: June 29th to July 1st.

SOUTHERN CALIFORNIA DENTAL ASSOCIATION. Los Angeles. June 28th to 30th.

SOUTHERN WISCONSIN DENTAL ASSOCIATION. Beloit. Two days: June 3d and 4th.

TEXAS STATE DENTAL ASSOCIATION. Waco. Three days: June 10th to 12th.

JULY.

CALIFORNIA STATE DENTAL ASSOCIATION AND THE ALUMNI ASSOCIATION OF THE COL-

LEGE OF DENTISTRY, UNIV. CAL. San Francisco. Three days: July 6th to 8th.

COLORADO STATE DENTAL ASSOCIATION. Colorado Springs. Three days: July 12th to 14th.

DELTA SIGMA DELTA FRATERNITY. Seattle. Three days: July 21st to 23d.

NEW JERSEY STATE DENTAL SOCIETY. Asbury Park. Three days: July 22d to 24th.

OREGON STATE DENTAL ASSOCIATION. Portland. Three days: July 12th to 14th.

VIRGINIA STATE DENTAL ASSOCIATION. Fortress Monroe. Three days: July 21st to 23d.

WASHINGTON STATE DENTAL SOCIETY. Seattle. Three days: July 15th to 17th.

WISCONSIN STATE DENTAL SOCIETY. Milwaukee. Three days: July 13th to 15th.

AUGUST.

FIFTH INTERNATIONAL DENTAL CONGRESS. Berlin, Germany. August 23d to 28th.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS. Old Point Comfort, Va. Three days: August 2d to 4th.

NATIONAL ASSOCIATION OF DENTAL FACULTIES. Old Point Comfort, Va. Three days: August 2d to 4th.

Examiners' Meetings.

CALIFORNIA BOARD OF EXAMINERS. Los Angeles, June 3d; San Francisco, June 15th.

CONNECTICUT BOARD OF COMMISSIONERS. Hartford. June 24th to 26th.

DISTRICT OF COLUMBIA BOARD OF EXAMINERS. Washington. July 1st to 3d.

FLORIDA BOARD OF EXAMINERS. Ocala. June 14th.

ILLINOIS BOARD OF EXAMINERS. Chicago. June 10th.

INDIANA BOARD OF EXAMINERS. Indianapolis. June 7th to 10th.

IOWA BOARD OF EXAMINERS. Iowa City. June 7th.

KANSAS BOARD OF EXAMINERS. Topeka. June 15th to 19th.

KENTUCKY BOARD OF EXAMINERS. Louisville. June 1st.

MAINE BOARD OF EXAMINERS. Portland. June 21st.

MASSACHUSETTS BOARD OF REGISTRATION. Boston. June 10th to 12th.

MICHIGAN BOARD OF EXAMINERS. Ann Arbor. June 14th.

MINNESOTA BOARD OF EXAMINERS. Minneapolis. June 7th.

NEBRASKA BOARD OF EXAMINERS. Lincoln. June 21st to 23d.

NEW HAMPSHIRE BOARD OF REGISTRATION. Manchester. June 1st to 3d.

NEW JERSEY BOARD OF REGISTRATION. Trenton. July 6th to 8th.

NORTH CAROLINA BOARD OF EXAMINERS. Asheville. June 18th.

OHIO BOARD OF EXAMINERS. Columbus. June 15th to 18th.

PENNSYLVANIA BOARD OF EXAMINERS. Philadelphia and Pittsburg. June 9th to 12th.

RHODE ISLAND BOARD OF REGISTRATION. Providence. June 22d to 24th.

SOUTH CAROLINA BOARD OF EXAMINERS. Glenn Springs. June 25th.

SOUTH DAKOTA BOARD OF EXAMINERS. Sioux Falls. July 13th to 15th.

TEXAS BOARD OF EXAMINERS. Waco. June 14th.

VERMONT BOARD OF EXAMINERS. Montpelier. July 13th to 15th.

VIRGINIA BOARD OF EXAMINERS. Richmond. June 8th.

WEST VIRGINIA BOARD OF EXAMINERS. Charleston. June 9th to 11th.

WISCONSIN BOARD OF EXAMINERS. Milwaukee. June 21st.

WYOMING BOARD OF EXAMINERS. Cheyenne. July 5th to 7th.

AMERICAN DENTAL SOCIETY OF EUROPE.

At the thirty-sixth annual meeting of the American Dental Society of Europe, held at Wiesbaden, Ger., April 9, 10, and 12, 1909, the following officers were elected for the ensuing year: Dr. M. J. Quintero, Lyons, France, president; Dr. W. A. Spaulding, Hyères, France, vice-president; Dr. T. G. Patterson, Geneva, Switzerland, honorary secretary; Dr. W. M. Cooper, Frankfurt a/M., Ger., honorary treasurer.

The next meeting of the society will be held in Paris at Easter, 1910.

T. G. PATTERSON, *Honorary Sec'y*,
2 Quai des Eaux-Vives, Geneva, Switzerland.

AMERICAN MEDICAL ASSOCIATION.

Section on Stomatology.

FOLLOWING is the program of the American Medical Association, Section on Stomatology, for its annual meeting at Atlantic City, June 8 to 11, 1909:

1. Chairman's Address. Edward C. Briggs, Boston, Mass.
2. "Enamel and Its Vitality." R. R. Andrews, Cambridge, Mass.
3. "A Study of Malnutrition in the School Child." E. Mather Sill, New York city.
4. "Suppression of the People's Disease." S. B. Luckie, Chester, Pa.
5. "The Role of the Teeth in Respiration." F. L. Stanton, New York city.
6. "Oral Prophylaxis." Alphonse Irwin, Camden, N. J.
7. "The Tonsils and the Teeth." G. Hudson-Makuen, Philadelphia, Pa.
8. "Mouth-Conditions in their Relation to Systemic Infection." Frederick K. Moorehead, Chicago.
9. "The Surgery of Cleft Palate." Geo. V. I. Brown, Milwaukee, Wis.
10. "General Therapeutics and Surgery in Dentistry." Arthur R. Dray, Philadelphia, Pa.
11. "Conservative Surgery for Treatment of Tumors of the Mandible." Thomas L. Gilmer, Chicago.
12. "A Method of Treating Mandibular Fractures." Robert T. Oliver, West Point, N. Y.
13. "The Treatment of Extreme Degrees of Malocclusion of the Teeth by Operations upon the Ramus of the Inferior Maxillary Bone." Wayne B. Babcock, Philadelphia, Pa.
14. "Osteomyelitis of the Jaw." H. H. Germain, Boston, Mass.
15. "Report of Two Record Tertiary Cases." G. Lenox Curtis, New York city.
16. "Trifacial Neuralgia." Fred Hussey, Providence, R. I.
17. "Anesthesia." L. G. Noel, Nashville, Tenn.
18. "A Summary of Thirteen Thousand Nitrous Oxid and Oxygen Anesthesias." Charles K. Teter, Cleveland, Ohio.
19. "Pseudo-pulpitis and Periostitis Due to Rheumatoid Arthritis." William Mills, Baltimore, Md.
20. "Dental Roentgenology." G. E. Pfahler, Philadelphia, Pa.

21. "A Number of Cases in which the Nasal Sinuses have been Enlarged by Orthodontia." E. A. Bogue, New York city.

22. "Report of the Committee of Revision of Pharmacopeia." Hermann Prinz, Chairman, St. Louis, Mo., and G. B. Squires, Somerville, Mass.

23. "Report of the Committee on Vital Statistics." Geo. V. I. Brown, Chairman, Milwaukee, Wis.; Vida A. Latham, Chicago, Ill.; Frederick K. Moorehead, Chicago, Ill.

EDWARD C. BRIGGS, *Chairman*,
EUGENE S. TALBOT, *Sec'y*.

NATIONAL ASSOCIATION OF DENTAL FACULTIES.

THE National Association of Dental Faculties will hold their annual meeting in connection with the National Association of Dental Examiners in the Hotel Chamberlin, Old Point Comfort, Va., August 2, 3, and 4, 1909, commencing at 10 A.M.

Rates will be the same as the National Association of Dental Examiners. Railroad and steamship rates will be given at a later date.

B. HOLLY SMITH, *Chairman Ex. Com.*,
Baltimore, Md.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

THE twenty-seventh annual meeting of the National Association of Dental Examiners will be held at the Hotel Chamberlin, Old Point Comfort, Va., the first session opening at 10 o'clock A.M., Monday, August 2, 1909, and continuing during the 3d and 4th.

The result of the mail vote by the committee to ascertain the consensus of opinion as to place and date, from October 19th to the present date, was ninety-one votes for Old Point Comfort the first three days of August, thirteen for Birmingham in March, seven for Birmingham in July; the president has therefore selected Old Point Comfort.

The rates will be: American plan \$3.00 per day without bath and \$4.00 per day with bath. Large and commodious meeting-rooms will be furnished free. Railroad and steamship rates will be furnished at a later date.

CHAS. A. MEEKER, *Sec'y*,
Newark, N. J.

GEORGIA STATE DENTAL SOCIETY.

THE forty-first annual meeting of the Georgia State Dental Society will be held at Cumberland Island, Ga., June 1, 2, and 3, 1909. All ethical practitioners are cordially invited.

D. H. McNEILL, *Cor. Sec'y*.

SOUTHERN WISCONSIN DEN- TAL ASSOCIATION.

THE fifteenth annual meeting of the Southern Wisconsin Dental Association will be held in Beloit, Wis., June 3 and 4, 1909.

C. W. COLLVER, *Sec'y*,
Clinton, Wis.

MASSACHUSETTS DENTAL SOCIETY.

THE forty-fifth annual meeting of the Massachusetts State Dental Society will be held at Boston, Mass., on June 9, 10, and 11, 1909.

W. E. BOARDMAN,
Boston, Mass.

FLORIDA STATE DENTAL SOCIETY.

THE twenty-sixth annual meeting of the Florida State Dental Society will be held in Ocala, Thursday, June 17, 1909, continuing in session three days. A cordial invitation is extended to ethical practitioners.

CARROLL H. FRINK, *Sec'y*,
301-2 Masonic Temple, Jacksonville, Fla.

TEXAS STATE DENTAL ASSO- CIATION.

THE annual meeting of the Texas State Dental Association will be held at Waco, June 10, 11, and 12, 1909.

We call the attention of manufacturers, exhibitors, and visitors to the circuit formed by the three meetings—Missouri (May 26-28), Oklahoma (June 3-5), and Texas as above. By this arrangement it is expected to secure a larger number of prominent men and valuable exhibits than heretofore.

The profession is cordially invited to attend.

J. G. FIFE, *Sec'y*,
Dallas, Tex.

PENNSYLVANIA STATE DENTAL SOCIETY.

THE forty-first annual meeting of the Pennsylvania Dental Society will be held at Hotel Schenley, Pittsburg, June 29 and 30, and July 1, 1909.

L. M. WEAVER, *Recording Sec'y.*

SOUTHERN CALIFORNIA DENTAL ASSOCIATION.

THE twelfth annual convention of the Southern California Dental Association will convene June 28, 29, and 30, 1909, at the College of Dentistry, University of Southern California, Fifth and Wall sts., Los Angeles, Cal.

CHAS. E. RICE, *Sec'y.*

NORTH CAROLINA DENTAL SOCIETY.

THE thirty-fifth annual meeting of the North Carolina Dental Society will be held at Asheville, N. C., June 23 to 26, 1909. The Battery Park Hotel will be the headquarters.

All ethical practitioners are cordially invited to attend.

J. C. WATKINS, *Sec'y,*
Winston-Salem, N. C.

MICHIGAN STATE DENTAL SOCIETY.

THE fifty-third annual convention of the Michigan State Dental Society will be held at Kalamazoo, on June 29 and 30, and July 1, 1909. An attractive and instructive program is in course of preparation, and a most profitable meeting is assured.

JAMES W. LYONS, *President.*
DON M. GRAHAM, *Sec'y.*

MAINE DENTAL SOCIETY.

THE forty-fourth annual meeting of the Maine Dental Society will be held at the Peak's Island House, Portland, Me., June 24, 25, and 26, 1909. It is confidently expected by the Executive Committee that this will be one of the most successful meetings ever held by this society. All ethical practitioners of dentistry are welcome to these meetings.

E. P. BLANCHARD, *Chm'n Ex. Com.,*
Portland, Me.
H. A. KELLEY, *Sec'y,*
Portland, Me.

SOUTH DAKOTA STATE DENTAL SOCIETY.

THE twenty-seventh annual meeting of the South Dakota State Dental Society will be held at Huron, on June 29 and 30, and July 1, 1909.

FERDINAND BROWN, *Sec'y,*
Sioux Falls, S. D.

SOUTH CAROLINA STATE DENTAL ASSOCIATION.

THE thirty-ninth annual meeting of the South Carolina Dental Association will be held at Glenn Springs, Monday, June 28th, continuing in session to July 2, 1909. Hotel rates: \$1.50 per day. All ethical practitioners are cordially invited to be present.

P. H. SHEALY, *Cor. Sec'y,*
Lexington, S. C.

COLORADO STATE DENTAL ASSOCIATION.

THE twenty-third annual meeting of the Colorado State Dental Association will be held in Colorado Springs, July 12, 13, and 14, 1909. The meeting is held in July this year in order to enable Dr. G. V. Black to be with us.

All ethical dentists are invited to attend and take part in the program.

CHAS. A. MONROE, *Sec'y,*
1 Willard Blk., Boulder, Colo.

INDIANA STATE DENTAL ASSOCIATION.

THE fifty-first annual meeting of the Indiana State Dental Association, to be held at Indianapolis June 29th and 30th and July 1st, will be a profitable meeting to those attending, a meeting that will be noted for its many practical suggestions.

C. D. Lucas, chairman of the Executive Committee, has completed arrangements for six excellent papers, four from our own state and two from special guests outside the state. W. S. Kennedy, supervisor of clinics, promises the largest, the best, and the most practical clinic in our history.

No dentist in Indiana who cares for his mental improvement can afford to miss this meeting. Mark off the dates. Do it now!

OTTO U. KING, *Sec'y,*
Huntington, Ind.

DELTA SIGMA DELTA FRATERNITY

AT SEATTLE EXPOSITION.

THE Seattle Auxiliary wishes to announce the annual Supreme Chapter meeting of Delta Sigma Delta Fraternity in Seattle, on July 21, 22, and 23, 1909. July 24th will be "Delta Sigma Delta day" at the Alaska-Yukon-Pacific Exposition.

C. F. Fiset, *Historian*.

VIRGINIA STATE DENTAL ASSOCIATION.

THE fortieth annual session of the Virginia State Dental Association will be held at The Chamberlin, Fortress Monroe, Va., July 21, 22, and 23, 1909. Every effort is being made to make this the most interesting and successful meeting of our society. Men of national reputation will give clinics and read papers. All ethical practitioners are cordially invited to attend.

W. H. PEARSON, *Cor. Sec'y*,
Hampton, Va.

CALIFORNIA STATE DENTAL ASSOCIATION

AND THE

ALUMNI ASSOCIATION OF THE COLLEGE OF DENTISTRY, UNIV. CAL.

THE California State Dental Association and the Alumni Association, College of Dentistry, University of California, will hold a joint meeting on July 6, 7, and 8, 1909, at the College building, Second and Parnassus aves., San Francisco.

Dr. John Q. Byram of Indianapolis and Dr. Weston A. Price of Cleveland will participate—which is a guarantee of a first-class meeting.

Manufacturers are being solicited to make exhibits and inasmuch as there will be a series of meetings on the Coast from June 28th to July 23d, it is expected that exhibitors will find it to their advantage to make the circuit.

Reserve these three days for a most profitable meeting; the knowledge gained will amply repay you.

ROBERT E. KEYS,
Com. on Publicity.

NEW JERSEY STATE DENTAL SOCIETY.

THE New Jersey State Dental Society will hold their annual meeting in the Casino, situated on the beach front at Asbury Park, N. J., beginning Wednesday, July 22d, and continuing through the 23d and 24th.

The clinics and exhibits are so large and varied that it has been necessary to secure a large building to accommodate them and the many visitors to the meetings. The Casino is ideally situated, large and cool and well adapted for dental meetings.

The Hotel Columbia has been selected as headquarters for the society, and it offers superior accommodations and low rates for those desiring to attend the meeting. All the principal railroads lead to Asbury Park, with many trains daily, also boat connections to New York for those desiring to travel by water.

All the dental profession should mark off the above dates and spend a delightful three days' vacation attending our meeting.

CHAS. A. MEEKER, *Sec'y*,
29 Fulton st., Newark, N. J.

EXAMINATIONS OF DENTISTS FOR THE ARMY.

THE Surgeon-general of the army announces that while there are no vacancies in the dental corps, he intends to hold examinations to establish an eligible list from which appointments will be made as vacancies occur.

Applicants for appointment as dental surgeons in the United States army will be authorized to present themselves at the nearest military post at which a commissioned officer of the medical corps is stationed, for examination as to physical qualifications for employment, and those found physically qualified will be invited to report at West Point, N. Y., or San Francisco, California, about August 1909, for the professional examination. No allowance can be made for expenses incurred in undergoing these examinations.

Application blanks can be procured upon application to the Surgeon-general of the army. The essential requirements to securing an invitation are that the applicant shall be between twenty-four and thirty years of age, a graduate of a standard dental college, and shall be of good moral character and habits.

Army dentists are employed under a three

years' contract at the rate of \$150 per month; are entitled to traveling allowances and suitable quarters; they have the privilege of purchase of supplies at the army commissary. The hours of official duty are from 9 A.M. to 4 P.M., although they are subject to emergency calls. During other hours they are permitted to treat persons not entitled to gratuitous services with their own materials.

ARMY DENTAL CORPS.

MEMORANDUM of changes of stations and duties of dental surgeons, U. S. army, for the month ending May 8, 1909:

Wm. G. Hammond: Left Fort Wingate, N. M., and arrived at Fort Logan, Colo., for duty. Relieved from duty at Fort Logan, Colo., in time to proceed to San Francisco, Cal., and sail June 5 for Philippine service. Granted leave of absence for two months, nineteen days.

George E. Stallman: Arrived at Fort Bliss, Texas, for duty.

Jean C. Whinnery: Ordered from Vancouver Barracks, Wash., to a tour of Alaskan posts—Fort Liscum, Fort William H. Seward, Fort Egbert, Fort Gibbon, Fort St. Michael, and Fort Davis.

Clarence E. Lauderdale: Ordered to Fort Logan, Colo., for duty, at the expiration of his present leave of absence.

Samuel W. Hussey: Relieved from duty in the Department of the Lakes, and ordered to his home, South Berkeley, Cal., for annulment of contract.

Geo. I. Gunckel: Left Fort Caswell, N. C., and arrived at Fort McPherson, Ga., for duty.

Hugh G. Voorhies: Left Fort Yellowstone, Wyo., and arrived at Fort William Henry Harrison, Mont., for duty.

IDAHO BOARD OF EXAMINERS.

THE Idaho State Board will meet in Boise, June 21 to 23, 1909. Applicants should bring operating instruments and engine.

E. L. BURNS, *Sec'y*,
Boise, Idaho.

WEST VIRGINIA BOARD OF EXAMINERS.

THE West Virginia State Board of Dental Examiners will hold their next examination on June 9, 10, and 11, 1909, at Charleston, W. Va.

J. F. BUTTS, *Sec'y*.

NEW HAMPSHIRE BOARD OF REGISTRATION.

THE next meeting of the New Hampshire Board of Registration in Dentistry for examination will be held June 1, 2, and 3, 1909, at Masonic Banquet Hall, Manchester, N. H.

A. J. SAWYER, *Sec'y*,
Manchester, N. H.

MINNESOTA BOARD OF EXAMINERS.

THE Minnesota State Board of Dental Examiners will hold a special meeting for the purpose of examining applicants for license on June 7, 1909. Meetings will be held at the Dental Department of the state university in Minneapolis, Minn. All applications must be in the hands of the secretary by May 28th.

For blanks and further information address

GEO. S. TODD, *Sec'y*,
Lake City, Minn.

KENTUCKY BOARD OF EXAMINERS.

THE Kentucky State Board of Dental Examiners meets the first Tuesday in June at 8 A.M. in the Louisville College of Dentistry for the examination of applicants for certificates. All applicants must be graduates of a reputable dental college. On request, the secretary will furnish application blanks for examination, which, with the fee of \$20, must be in his hands ten days before the date of examination.

J. RICHARD WALLACE, *Sec'y*,
The Masonic, Louisville, Ky.

MICHIGAN BOARD OF EXAMINERS.

THE next meeting of the Michigan State Board of Examiners for the examination of candidates for license to practice dentistry in Michigan will be held at the Dental Department of the University of Michigan in Ann Arbor, beginning Monday morning, June 14, at nine o'clock. Applications must be in the hands of the secretary at least fourteen days before the examination. Application blanks and rules governing examinations will be furnished by any member of the board.

A. B. ROBINSON, *Sec'y-Treasurer*.

SOUTH CAROLINA BOARD OF EXAMINERS.

THE next meeting of the South Carolina State Board of Dental Examiners will be held at Glenn Springs, near Spartanburg, S. C., beginning on Friday, June 25, 1909. All applicants for license must be present and register for examination on that day. For further information address

B. RUTLEDGE, *Sec'y*,
Florence, S. C.

OHIO STATE DENTAL BOARD.

THE Ohio State Dental Board will meet in Columbus, June 15 to 18, 1909, for the examination of applicants for license.

Only graduates of reputable dental colleges are eligible. All applications, together with the fee of \$25.00, should be in the hands of the secretary not later than June 5th.

For further information and blank applications address

F. R. CHAPMAN, *Sec'y*,
305 Schultz Bldg., Columbus, Ohio.

IOWA BOARD OF EXAMINERS.

THE next meeting of the Iowa State Board of Dental Examiners for examination will be held at Iowa City, beginning June 7, 1909, at 9 A.M.

Practical examinations will be held in both operative and prosthetic dentistry. Applications must be in the hands of the secretary by June 1st.

For further information address

E. D. BROWER, *Sec'y*,
LeMars, Iowa.

TEXAS BOARD OF EXAMINERS.

THE regular meeting of the Texas State Board of Dental Examiners will be held in Waco, Texas, beginning at 9 A.M., Monday June 14, 1909.

Diplomas not recognized or registered; examinations are required of all. No interchange of license with any other state. No special examination to practitioners already in practice. Applications, accompanied by a fee of \$25, should be in the secretary's hands by June 10th. For further information address

BUSH JONES, *Sec'y*,
Dallas, Texas.

VIRGINIA BOARD OF EXAMINERS.

THE next regular annual meeting of the Virginia State Board of Dental Examiners will be held in Richmond, Va., June 8, 1909.

For further information address

JOHN P. STIFF, *Sec'y*,
Fredericksburg, Va.

INDIANA BOARD OF EXAMINERS.

THE next regular meeting of the Indiana State Board of Dental Examiners will be held in the State-house in Indianapolis, beginning Monday, June 7, 1909, and continuing four days. All applicants for registration in this state will be examined at this time. This will be the last meeting of the year 1909. For further information and instruction address

F. R. HENSHAW, *Sec'y*,
Middletown, Ind.

ILLINOIS BOARD OF EXAMINERS.

THE next regular meeting of the Illinois State Board of Dental Examiners for the examination of applicants for a license to practice dentistry in the state of Illinois will be held in Chicago, at the Chicago College of Dental Surgery, S. E. corner Wood and Harrison sts., beginning Thursday, June 10, 1909, at 9 A.M.

Applicants must be in possession of the following requirements in order to be eligible to take the examination: (1) Any person who has been engaged in the actual, legal, and lawful practice of dentistry or dental surgery in some other state or country for five consecutive years just prior to application; or (2) is a graduate and has a diploma from an accredited high school, or a certificate signed by a state superintendent of public instruction or his duly authorized deputy or equivalent officer, acting within his proper or legal jurisdiction, showing that the applicant has a preliminary education equal to that obtained in an accredited high school, and is a graduate and has a diploma from the faculty of a reputable dental or medical college, school, or dental or medical department of a reputable university, and possesses the

necessary qualifications prescribed by the board.

Candidates will be furnished with proper blanks and such other information as is necessary on application to the secretary. All applications must be filed with the secretary five days prior to the date of examination. The examination fee is twenty dollars, with the additional fee of five dollars for a license.

Address all communications to

J. G. REID, *Sec'y*,
1204 Trude Bldg., Chicago, Ill.

MASSACHUSETTS BOARD OF REGISTRATION.

THE next meeting of the Massachusetts Board of Registration in Dentistry will be held in Boston, June 10, 11, and 12, 1909. Application blanks will be furnished by

G. E. MITCHELL, *Sec'y*,
Haverhill, Mass.

CONNECTICUT DENTAL COMMISSIONERS.

A MEETING of the Dental Commissioners of the State of Connecticut will be held on Thursday, Friday, and Saturday, June 24, 25, and 26, 1909, at Hartford, Conn., to examine applicants for license to practice dentistry.

GILBERT M. GRISWOLD, *Recorder*.

FLORIDA BOARD OF EXAMINERS.

THE next annual meeting of the Florida State Board of Dental Examiners will be held in Ocala, Fla., June 14, 1909, at 9 A.M.

Applicants for certificates to practice dentistry in this state will be required to exhibit diplomas from reputable dental colleges, and take examination, both theoretical and practical. The theoretical will embrace all subjects taught in the dental colleges; the practical, examination on both operative and prosthetic dentistry. Board will furnish head-rests and blowpipe. Applicants must furnish other necessary instruments. Each applicant must furnish photograph with application. Any further information will be furnished on application.

W. G. MASON, *Sec'y*,
Tampa, Fla.

NEBRASKA DENTAL BOARD.

THE Nebraska Dental Board of Examiners will hold the next regular examination at the State-house, Lincoln, June 21, 22, and 23, 1909. For further information address

H. C. BROCK, *Sec'y*,
North Platte, Nebr.

NORTH CAROLINA BOARD OF EXAMINERS.

THE North Carolina State Board of Dental Examiners will meet at 10 A.M. Friday, June 18, 1909, in Asheville, N. C. All applicants must be graduates of a reputable dental college, and will be required to present diplomas for inspection, and register on or before the above date.

For further information address

R. H. JONES, *Sec'y*.

RHODE ISLAND BOARD OF REGISTRATION.

THE Rhode Island Board of Registration in Dentistry will meet for the examination of candidates at the State-house, Providence, R. I., Tuesday, Wednesday, and Thursday, June 22, 23, and 24, 1909. Application blanks and particulars may be obtained from

HARRY L. GRANT, *Sec'y*,
10 Weybosset st., Providence, R. I.

KANSAS BOARD OF EXAMINERS.

THE Kansas State Board of Dental Examiners will hold a meeting for the examination of applicants for license to practice dentistry in Kansas, beginning Tuesday morning at nine o'clock, June 15, 1909, and continuing until June 19th.

All applications must be in the hands of the secretary by June 10th. The examination fee is twenty-five dollars. Only graduates of reputable schools or those having practiced five consecutive years in another state are eligible for examination. The meeting will be held at Topeka, Kans., in the roof garden of the National Hotel.

For further information or blanks write the secretary.

G. F. AMBROSE, *President*,
Eldorado, Kans.
F. O. HETRICK, *Sec'y*,
Ottawa, Kans.

WISCONSIN BOARD OF EXAMINERS.

THE next annual meeting of the Wisconsin State Board of Dental Examiners will be held in the Dental Department of the Marquette University, at Milwaukee, Wis., beginning June 21, 1909.

F. A. TATE, *Sec'y.*

CALIFORNIA BOARD OF EXAMINERS.

THE next examination by the Board of Dental Examiners of California will be held in Los Angeles, beginning on June 3d. This will be followed by an examination in San Francisco beginning on June 15th.

C. A. HERRICK, *Sec'y.*

PENNSYLVANIA BOARD OF EXAMINERS.

THE Pennsylvania Board of Dental Examiners will conduct examinations simultaneously in Philadelphia and Pittsburg, June 9, 10, 11, and 12, 1909. For application papers, or any other information, write to Dr. Nathan C. Schaeffer, secretary Dental Council, Harrisburg, Pa.

W. D. DELONG, *Sec'y.*

MAINE BOARD OF EXAMINERS.

A MEETING of the Maine Board of Dental Examiners will be held at the Common Council Rooms, 53 Market st., Portland, on Monday, June 21, 1909, at 2 P.M. Theoretical examinations will be in writing. Practical examination will include operations in crown work and the insertion of fillings of cohesive and of non-cohesive gold foil.

All applications, together with the fee of twenty dollars, must be in the hands of the secretary on or before Monday, June 14th.

DANA W. FELLOWS, *Sec'y,*
Portland, Me.

DISTRICT OF COLUMBIA DENTAL EXAMINERS.

THE next semi-annual examination of the Board of Dental Examiners of the District of Columbia will be held at the George Washington University, July 1, 2, and 3, 1909. All applications for examination must be accom-

panied by a fee of ten dollars, and filed with the secretary by June 22, 1909. For further information address

STARR PARSONS, M.D., D.D.S.,
1309 L st., N. W., Washington, D. C.

VERMONT BOARD OF DENTAL EXAMINERS.

THE next meeting of the Vermont Board of Dental Examiners for the examination of candidates to practice dentistry will be held at Montpelier, July 13 to 15, 1909.

Headquarters will be at the Pavilion Hotel. Application, together with fee, \$25, must positively be in the hands of the secretary before July 1st.

Application and other blanks required, including information, can be had of

J. HOLMES JACKSON, *Sec'y,*
Burlington, Vt.

WYOMING BOARD OF EXAMINERS.

THE Wyoming State Board of Dental Examiners will hold a meeting for the purpose of examining applicants for license to practice dentistry, July 5, 6, and 7, 1909, at the Senate Chamber, Cheyenne, Wyoming.

All applications for examination must be in the hands of the secretary, together with the fee of \$25, fifteen days before the examination. Applicants must be graduates from reputable dental colleges recognized by the National Association of Dental Faculties. For further information address

PETER APPEL, JR., *Sec'y,*
Cheyenne, Wyoming.

SOUTH DAKOTA BOARD OF EXAMINERS.

THE next meeting of the South Dakota State Board of Dental Examiners will be held at Sioux Falls, S. D., July 13, 1909, beginning at 1:30, and continuing for three days.

Both practical and written examination will be required of all candidates, and all applications, together with the examination fee of twenty-five dollars, must positively be in the hands of the secretary not later than July 5th, otherwise they will not be admitted to examination.

G. W. COLLINS, Vermillion, S. D.

COLUMBUS (OHIO) DENTAL SOCIETY.

AN AMERICAN MEMORIAL TO THE LATE PROF.
DR. WILLOUGHBY DAYTON MILLER.

At a meeting of the Columbus Dental Society of Columbus, Ohio, held Tuesday, March 23, 1909, the following resolutions were adopted:

Whereas, The late Dr. Willoughby D. Miller, who devoted his life to untiring research for the benefit of dental science, was an American and an Ohioan by birth; and

Whereas, It is desired to obtain an expression of opinion from the various dental societies and associations meeting during the interval pending the next meeting of the Ohio State Dental Society (December 1909); therefore, be it

RESOLVED, That the Columbus Dental Society of Columbus, Ohio, suggest the advisability of raising a fund for a suitable memorial by the dental profession of America, to commemorate the life and work of the said Dr. Willoughby D. Miller; said memorial to take such form as may be determined by the consensus of opinion by the various dental organizations of this country; and be it further

RESOLVED, That the Ohio State Dental Society, at its next annual meeting, be re-

quested to take charge of the Miller American Memorial matter and of such correspondence as may be received pertaining to the same.

H. V. COTTRELL, *President*,
GILLETTE HAYDEN, *Sec'y*.

NEW JERSEY BOARD OF REGISTRATION.

The New Jersey State Board of Registration and Examination in Dentistry will hold their semi-annual examination in the Assembly chamber of the State-house, Trenton, N. J., beginning Tuesday, July 6, 1909, and continuing through the 7th and 8th.

Practical examinations will be held on the 6th, theoretical examinations on the 7th and 8th. Practical work consists of soldering a gold or silver plate, one gold filling, and one amalgam filling. The gold filling must be an approximal one, with an approximating tooth in position.

Candidates are requested to bring their patients. Photograph and preliminary credentials must accompany the application. Sessions begin promptly at 8 A.M. each day.

Applications must be in hands of the secretary ten days prior to the examination.

CHARLES A. MEEKER, D.D.S., *Sec'y*,
29 Fulton st., Newark, N. J.

UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING APRIL 1909.

April 13.

- No. 917,934, to JOHANN H. DRAEGER. Blow-pipe.
No. 917,995, to HENRY E. BOWN. Dental cabinet.
No. 918,276, to A. W. BROWNE. Adjustable wall bracket.
No. 918,281, to E. C. CHAMBERS. Tooth-cleaning device.

April 27.

- No. 919,440, to W. E. LAWSON and W. R. SMITH. Brush.
No. 919,593, to MICHAEL KELLEY. Dental engine.
No. 919,717, to H. F. HAMILTON. Dental syringe.
No. 919,777, to R. B. SAVIN and W. C. HARVEY. Adjustable wall bracket.
No. 919,901, to W. T. LYON. Swager.



DR. B. OSCAR DOYLE.

THE DENTAL COSMOS.

VOL. LI.

JULY 1909.

No. 7.

ORIGINAL COMMUNICATIONS.

THE DENTAL RELATIONSHIPS OF ARTHRITISM.

By EDWARD C. KIRK, D.D.S., Sc.D., Philadelphia, Pa.

(Read before the National Dental Association, in general session, at the annual meeting, Birmingham, Ala., March 30, 1909.)

IN the study of disease phenomena there is an ever-increasing tendency to investigate more deeply into the underlying causes of the many departures from normality which constitute "the ills that flesh is heir to." At no time in the history of the healing art has the search for the remote causes of disease been more active than at present, and as a result of this persistent investigation the prospect of a rational solution of many of the graver pathological problems grows continually brighter.

The era of bacteriological investigation inaugurated three decades ago by the studies of Koch and Pasteur has been fruitful in explaining the mechanism of infection and in isolating the *materies morbi* of a long category of disorders, besides throwing a flood of light upon the biological activities of a vast number of pathogenic bacteria. The mode of action of disease-producing organisms has been made out with such clearness in so many specific instances that the major prin-

ciples governing the processes of infection and of tissue reaction toward the infecting organism may be said to have been scientifically demonstrated. The varying resistance of individuals to the invasion of infectious organisms has, however, driven the inquiry beyond the part or rôle played by bacteria as factors in disease production, into the study of the defensive forces of the organism against bacterial invasion, a problem which must necessarily be solved before the science of pathology can furnish a full answer to the question of disease causation—or, indeed, before we can clearly understand what disease is, in a strictly scientific sense.

It has long been recognized that the susceptibility to disease is more pronounced in certain individuals than it is in others, and from very early times this peculiar tendency has given rise to various theories as to its origin. It has been referred to as a dyscrasia or as a diathesis, acquired or inherited, and

much of the old humoral pathology involved the same conception. Modern investigation is slowly evolving the solution of the problem by studying the nature of the defensive forces of the organism, and results thus far attained justify the belief that certain definite substances in the blood and body juices of immune individuals constitute the means upon which the defensive mechanism is based. These defensive bodies—as antitoxins, agglutinins, bacteriolysins, and opsonins, as they are variously described—appear to be coincident with that condition of sound bodily health which is the result of a normal physiological equilibrium, and are absent or less active when the normal physiological equilibrium is disturbed. In proportion as the study of bacterial invasion has developed the underlying principles which upon the one hand determine how invasion takes place, and upon the other hand how the invasion is combated by the normal defensive mechanism of the body, the attitude of medical science toward the problem of disease has tended to focus itself more strongly upon the prophylactic side, and to address its efforts to disease prevention by building up the natural defensive forces of the organism to their highest efficiency. The crusade against the spread of tuberculosis by enforcing better hygienic conditions, both personal and environmental, the successful warfare against yellow fever by destruction of the breeding-places of the mosquito, and similar efforts to eradicate the unhygienic conditions that harbor the common house-fly, the house-rat, and similar carriers of disease germs are common and familiar examples.

RELATION OF FOOD HABITS TO SYSTEMIC VULNERABILITY.

A more recent crusade, and, while less dramatic, a by no means less important one for the reinforcement of the bodily defenses against disease invasion, is the dietetic propaganda inaugurated by Mr. Horace Fletcher, who has demonstrated by many practical examples and by various series of carefully conducted scien-

tific tests that human efficiency, measured either as units of potential, as intellectual effort, or as resistance to disease invasion, is directly related to the question of nutrition, and he has incidentally shown that our conceptions of the standards of normality in the nutritional process, in so far as they relate to intake of food in relation to output of work, have heretofore been wrong. Mr. Fletcher has shown that we have not only eaten too much, but that we have eaten badly, and that in thus overfeeding ourselves we have invited disease from without by creating it from within.

The dietetic question in relation to health is a very ancient one; indeed, the consideration of some of its aspects must, in the nature of the case, have been coincident with man's earliest attempts to feed himself. Like all other intricate physical problems, whatever knowledge was attained in relation to it was derived wholly from empirical observation until quite recent times, when this vital question, like all other phenomena of nature, was brought under the exacting scrutiny of precise scientific study. It had been observed for years that excessive feeders died, as a rule, earlier than the more abstemious, and it further became known that certain types of disease were more common among the overfed, indeed were characteristic of the so-called "high liver," and still later it was noted that these over-nourished individuals were actually manufacturing within their own bodies, as an output or waste product of their disordered nutritional processes, certain substances that were poisonous in character and which exerted a toxic effect upon the entire organism, this effect becoming intensified until it became fatal to the individual, or so reduced the natural defenses of the body that he was carried off by an acute disease due to a bacterial invasion from without.

The development of the idea of a diathetic state or condition due to faulty nutrition and culminating in auto-intoxication or self-poisoning, with reduction of the defensive forces against bacterial invasion, has had its principal growth and most pronounced expression in France,

and it is due to the devoted labors of certain eminent investigators of that country that this important view of disease production has attained scientific prominence and is gaining a wider practical significance.

Prof. Dr. Van Noorden of Frankfurt a. M., in his monograph on "Diseases of Metabolism and Nutrition," says: "Within recent years the idea has become firmly established in the minds of physicians that a variety of morbid phenomena are due to auto-intoxication—are, in other words, attributable to certain poisonous metabolic products. This view, it is true, is not new, for it was familiar to the physicians of past generations, and was part of the teachings of the medical folk-lore of long ago. It was not, however, until Bouchard and his pupils published their investigations on the subject of auto-intoxication that this theory attained the dignity of a scientific doctrine. At first we German physicians were by no means inclined to accept the theory of auto-intoxication that was being so enthusiastically proclaimed. Of late years, however, our attitude has become more friendly to the doctrine; this change of front is due to the fact that a number of toxic products of metabolism have actually been isolated, and their mode of origin in the organism and their pathologic effect determined to the satisfaction of the former critics of the doctrine. We do not, of course, know all that we should properly know about the poisonous metabolic products that we incriminate in so many morbid states; but in a large group of important symptom-complexes we are fortunately in possession of a number of facts that suffice to ground the doctrine of auto-intoxication on a solid chemical basis."

I have made the foregoing quotation from an eminent exponent of German scientific conservatism to emphasize the fact that the doctrine of auto-intoxication as a factor in disease causation and as a prodromal state of bacterial invasion rests upon an accepted scientific foundation. It is also to be understood that the phase of auto-intoxication here under consideration is that which is due to

faulty metabolism the result of disordered nutrition, and is exclusive of intoxication resulting from the absorption of putrefactive toxins produced by intestinal bacteria.

"ARTHRITISM."

The subject of malnutrition and its effects is quite too extensive for consideration in a brief paper, but there are certain general features of the subject that confront us in our special work as dental practitioners to which I desire to ask your attention, namely, the class of cases exhibiting that type of malnutrition which the French students of the general question designate as arthritism.

Dr. L. Pascault of Paris, in his brochure entitled "Arthritism the Disease of Civilization," has given a most graphic picture of the general aspects and mode of development of the complexus of disorders which are characteristic of the arthritic state, and I cannot do better than briefly epitomize some of the main features of his essay.

The typical arthritic, according to Pascault, is rarely developed in a single generation; he is generally a product of several generations of bad dietetic habits. The ancestor of the arthritic—a grandfather, perhaps, or some more remote relative in direct line—was strong, vigorous, active, and generally endowed with the qualities that assure success in life; a great worker, either physically or mentally, he died in old age after a useful life, leaving a numerous progeny. As in the case of well-balanced individuals the intake of food is usually proportioned to the daily expenditure of energy, we may conclude *a priori* that this hearty and vigorous ancestor was also a great eater, and from that fact we may note certain consequences, among which according to Pascault are the following: His digestive apparatus, put to work upon a bountiful food supply, becomes developed in all of its constituent parts, his stomach acquires the habit of no longer feeling satisfied until it has reached a maximum distension, and all his tissues are obliged to accelerate their metabolic processes in

order to utilize it, and thus lose the habit of functioning economically, hence the constantly recurring need which, transmitted to the nervous centers and perceived by consciousness, translates itself into an exaggeration of the appetite, inducing him to eat more than is really necessary for him. This is not all, for of the foods thus unwisely taken, while the carbohydrates (starches, sugars, and fats) are easy of combustion and leave in the economy after their destruction only liquid or gaseous waste products easy of elimination, it is not the same in the case of the nitrogenized foods, which are broken up with difficulty and require from the liver and kidneys a very complicated work of rehandling before their waste products are thrown out. In the case of this pre-arthritic ancestor, he has had not only muscular or cerebral activity, but all his organs, all his tissues, all of his cells without exception, functionate with abnormal activity. No machine can endure being continually overdriven, no matter how well it may be constructed; it becomes fatigued and worn out in the long run, and so in the case of the particular type of human machine under consideration we may say that the exuberance of health and activity which characterized the pre-arthritic ancestor was the real promoter of the morbid troubles from which his descendants suffer.

The representatives of the second generation are handicapped by an inheritance which if uncorrected will cause them to develop into true arthritics. They have, in spite of a robust appearance, inherited a diminished vigor, an exaggeration of appetite which they do not recognize, or which, on the other hand, they may regard as a virtue of health rather than an abnormality, and above all they have inherited a cellular impress characterized by rapidity of metabolic activity readily recognized by the appearance in the urine, not of abnormal morphological elements, for destructive changes have not as yet begun to appear in the tissues, but there is a pronounced augmentation of all the normal waste products—urea, uric acid, phosphoric

acid—and notably of the total acidity of the urine. The incessant effort demanded of the stomach, the intestines, and the large glands, the liver and pancreas, concerned in the disposition of this excess of food involves a corresponding excitement of the vascular system and the induction sooner or later of a passive, even permanent congestion of the digestive viscera, leading to plethora and later to obesity as middle life is reached, or even earlier. Thus the arthritic transforms his excess of carbohydrate food into fat, or he may expel through his urine the sugars which have not found a place in his muscles or his liver, developing thus a glycosuria or diabetes, or he may accumulate his residual proteids at those points of his economy or in those tissues where the circulation is sluggish, as in the articular tissues, developing gout, or may eliminate them through his mucous membranes, producing catarrh. To these results must be added all those morbid manifestations of a disordered over-nutrition grouped under the general term lithiasis—that is to say, gravel and stone of the bladder, kidney, and liver, together with their corollaries, cystitis and hepatic and nephritic colic.

There yet remains to be considered the degenerative effect of this over-stimulation of cell function by an excess of food, with the corresponding production and retention of the irritative waste products of nutrition, upon the cells themselves.

The secreting cells, those of sensation, motion, and special sense, act differently in the presence of an excess of pabulum to the supporting or connective tissue group of cell elements. The latter, according to Pascault, appear to be endowed with a considerable power of attraction and absorb nutriment with avidity; they assimilate it, hypertrophy, multiply with extreme rapidity, then shortly they undergo fibrous change, and shrinking like a cicatricial tissue they strangle the secreting cells, or those of sensation, motion, or special sense, as the case may be, which under normal conditions it was their mission to support. Or, on the other hand, if the nutrient material is rich in calcareous salts, the cells become

saturated or calcified, thus cutting off their supply of blood and lymph and inducing the condition broadly described as sclerosis.

VARIOUS PATHOLOGICAL EXPRESSIONS OF NUTRITIONAL IMBALANCE — ALVEOLAR PYORRHEA.

Time will not permit a more extended recital of the progressive phases or detailed phenomena portrayed by the author from whose graphic picture of arthritism I have drawn these few examples of its varied expressions. Indeed, so manifold are the clinical manifestations of the underlying morbid state of nutrition induced by an ill-balanced food habit with respect to the needs of the individual, that any description must needs be but schematic and general in character. What I do hope to emphasize is that there is such a state as a physiological nutritional equilibrium which when over-balanced upon the side of nutritional excess develops a condition of disease within the economy itself which may have a variety of local as well as general manifestations, and which further becomes a precursor of other disease phenomena by lessening vital resistance so that invasion of pathogenic bacteria becomes possible. The secondary pathological expressions of over-nutrition which characterize the arthritic state may manifest themselves in widely different ways from a clinical standpoint, depending upon the character of the organs or tissues which are most prominently involved; thus the groups of symptom complexes may be such as arise from liver complications, with structural as well as functional disturbances of that organ and of the pancreas, and produce the type of individual designated by Pascualt as the *hepatique*, or the kidney may become the seat of lesions with a corresponding train of disturbances creating the *type renal* of the French, and similarly the disorder may have its dominating expression as the nervous or catarrhal, according as the corresponding structures and tissues are most prominently involved; but in all these classes the underlying fault or aberration from physiological normality

appears to be a lack of nutritional balance characterized in its beginnings and through its formative period by an over-nutrition, due to the intake of an excess of pabulum which is beyond the power of the organism to properly utilize.

It is in precisely the group of morbid states here under consideration that we find the majority of those disorders which affect the tissues constituting the retentive apparatus of the teeth, and which we collectively designate as interstitial gingivitis, pyorrhea alveolaris, etc., as well as that other disorder the etiology of which has so long been shrouded in mystery, viz, chemical erosion of the teeth. Medical literature abounds in reports of the coincidence of destructive necrotic inflammations of the alveolar structures with the various nutritional disturbances due to the arthritic condition. The whole of the major work of Talbot on "Interstitial Gingivitis" is a research which by any candid and intelligent reasoner should be accepted as a demonstration that the auto-intoxication resulting from malnutrition is the principal factor which leads to bacterial invasion of the alveolar structures, causing destructive inflammation of the supporting tissues of the teeth. M. L. Rhein, in a paper on the "Oral Expressions of Malnutrition," read before the Odontological Society of New York in March 1896, and again in a paper on "Pyorrhea Alveolaris," read before the Chicago Dental Society in February 1899, has clearly related the alveolar disease to malnutrition as its general predisposing cause. C. N. Peirce, H. H. Burchard, and others too numerous to mention, have advocated the same view, and it is at least worthy of note that in the majority of instances those who have held to the malnutritional theory have based their convictions upon the results of scientific research as well as upon careful clinical observation.

In several communications, notably in a paper read before the Maryland State and District of Columbia Dental Societies in June 1908, on "The Constitutional Element in Certain Dental Disorders," I endeavored to show, among other things, the method by which the physiological

equilibrium of nutrition is disturbed in cases of over-nutrition, and how insufficiency of oxidizing power leads to the production of certain abnormal waste products, causing auto-intoxication, and that the poisoning and irritation of the alveolar tissues in that manner renders them susceptible to bacterial invasion. I furthermore called attention to the fact that the character as well as the total quantity of food was an important factor in determining the nature of the subsequent auto-intoxication; that where the totality of food was in excess of the total oxygen-carrying capacity of the blood as measured by its hemoglobin content, and where the carbohydrate factor of the food supply was excessive, there resulted not only a carbonic acid toxemia, with high urinary acidity, but because of the selective affinity of the carbohydrates for the oxygen supply the proteids were incompletely oxidized and a consequent increase of formation of the purin bases occurs instead of the normal output of nitrogen surplus as urea—a point of view confirmed by the chemical study of the urine in arthritic cases.

We are yet lacking a careful study of the opsonin content of the tissues of the pre-arthritic individual—that is to say, before the stage when distinct lesions of the secretory apparatus are recognizable; but because of the known toxemia resulting from excessive carbonic acid formation and the suboxidation of proteids in the primary arthritic stages on the one hand, and on the other hand the susceptibility of these subjects to bacterial invasion, as evidenced by the prevalence of pyorrhea alveolaris among them, and their proneness to attacks of influenza and of rheumatism, which latter has now come to be classed as a bacterial infection, we are justified, upon *a priori* grounds at least, in suspecting that even in the earlier stages the arthritic subject has a diminished resistance to bacterial invasion, and would therefore show a lowering of the defensive bodies below that of the normally healthy individual.

With respect to the effect of a dietetic habit or regimen low in nitrogen and excessive on the carbohydrate side, the

prevalent conditions among the Hindus furnish an interesting example. All American and European dentists practicing in India bear testimony to the prevalence of pyorrhea alveolaris in that country among Hindus and Europeans alike. Dr. H. B. Osborn of Rangoon, Burmah, writing to me from Chittagong in December 1908, says, concerning pyorrhea: "When one thinks that every native and almost every European mouth in India is in somewhat the same condition (*i. e.* suffering from a 'shaky' condition of the teeth) it makes one wish one knew more about it. While I did not learn very much about it in college, I think I am right in saying that I was taught that pyorrhea was curable. With all respect to the authors of that statement, I would like to see a case cured in India. I am strongly of the opinion (I am very humble regarding the worth of my opinions) that local treatment is of only slight temporary value, and systemic treatment is something in regard to which I am in dark ignorance." The observations of Dr. Osborn as to the prevalence of pyorrhea alveolaris in India are borne out by many other competent observers. The Hindus are almost wholly vegetarians. Recently the question of the diet of the Hindu in relation to his physical condition and development has been the subject of governmental investigation. Prof. D. McCay has made a report to the Indian government which is reviewed in *Nature* for November 12, 1908. He finds from his study of Hindu physique that while the native Bengali maintains his nitrogenous equilibrium on his vegetable diet, nevertheless the low nitrogen intake acts deleteriously, reduces the blood protein, and tends to produce degenerative changes, especially in the kidneys. He is not only physically incapable, as compared with the European, but he also becomes more easily exhausted; his blood pressure is below normal, and his lack of stamina makes him an easy prey to infectious diseases. Professor McCay further suggests the probability of dangerous decomposition products being formed from the large fat and carbohydrate intake rendered necessary by a

poor nitrogen diet (auto-intoxication). Professor McCay, commenting upon the prevalence of diabetes in its worst form among the Bengal natives, attributes it to the carbohydrate excess in their dietary, and asserts that it proves conclusively that the evils from this cause may be more real than those attributed to an excess of protein in the diet. The vigorous African savage has been generally a meat-eater, and if whites make their homes successfully in the tropics it is probable that the protein intake in their diet will not be radically changed to meet the climatic conditions.

The foregoing observations as to the relationships of malnutrition to alveolar infection have been already pointed out by other writers, and the coincidence of diabetes mellitus and alveolar pyorrhea has been specifically referred to by Rhein in the paper already quoted. In my own communications I have endeavored to trace the relationship of improper feeding to the condition of malnutrition which precedes the alveolar infection or other tissual or organic changes—notably the renal involvement—as the case may be. The diabetic factor is a striking and important one. As I have shown in several papers, a condition simulating diabetes mellitus often occurs as a functional disturbance before any tissual lesion is observable, or at least before glycosuria is manifest. This functional disturbance is the phosphatic diabetes of Ralfe and Tessier, and corresponds to that stage of arthritism described by L. Pascault in which the inherited cellular impress of a high rate of metabolic activity produces under the further stimulation of an excess of pabulum a pronounced augmentation of all the normal waste products, and which in the phosphate diabetic expresses itself as an abnormal phosphatic loss through the urine, with corresponding symptoms of general nutritional disturbance. The mechanism of this phosphatic loss I have elsewhere described in detail. Diabetic glycosuria occurs at a later stage of arthritism, and the susceptibility of diabetics to bacterial invasion has been gen-

erally noted and carefully studied. Rhein has found the pyorrheal condition so prevalent and so characteristic among diabetics that he has proposed for the alveolar disorder in these cases a distinctive designation. Wm. Martin Richards of New York, in the *Journal of the American Medical Association* for January 23d of this year, writes to the editor as follows: "I have lately been impressed by the coincidence of pyorrhea alveolaris (pus coming up over the gums from the roots of the teeth) and sugar and albumin in the urine, and the disappearance of these symptoms when the teeth were cured. I am collecting two hundred cases of pyorrhea alveolaris with urine examinations before and after the pyorrhea is cured. I wish to ask other practitioners who are interested in this subject to kindly send me any results which they have in the same line—that is, when they find sugar and albumin in the urine, will they have the teeth investigated and find out how many of such patients have pyorrhea alveolaris? This is a subject of interest to all of us, and I am sure that the results will amply repay us for the trouble involved."

In carrying out such an investigation it would be of the utmost importance to determine to what extent the oral condition and the state of the kidneys were interchangeably influenced by treatment of either morbid state. The communication of Dr. Richards seems to imply that in the case which he had under observation the cure of the alveolar pyorrhea wrought a cure of the kidney trouble. In the absence of positive data this would seem doubtful, for reasons which will appear later.

The susceptibility of diabetics to bacterial infection, especially to pus infections, has long been recognized and is well known. Recently various scientific studies of the altered defensive mechanism of diabetics has been made, so that we are in possession of considerable data of a practical character with respect at least to the degree of increased susceptibility which diabetics manifest toward pus-producing organisms as compared

with the resistance of the normal individual. In an elaborate research made by Drs. John C. Da Costa and E. J. G. Beardsley, published in the *American Journal of the Medical Sciences* for September 1908, it is shown from an average of fifty cases of diabetes mellitus that the opsonic index varied considerably with respect to streptococcus, to staphylococcus, and to tubercle bacillus, the three organisms employed in the tests. The average index of all the cases for each organism named was as follows: Staphylococcus 0.65, streptococcus 0.56, and tubercle bacillus 0.73. That is to say, the index was only a little more than half normal for the ordinary pus-forming bacteria, while it was scarcely three-fourths normal for tubercle bacillus. It is regrettable that for our present purposes the opsonic reaction to the pneumococcus was not also tested, that organism being so constantly concerned in invasions of the alveolar tissues.

I have called attention to the work of Da Costa and Beardsley in order to emphasize the fact that in diabetes mellitus the resistance to bacterial invasion of the pus-producing variety is greatly reduced below the normal standard, which fact, in connection with the data I have brought forward to show the prevalence of alveolar pyorrhea among diabetics and the prevalence of diabetes mellitus among those of arthritic type due to the effects of defective food habits and prolonged overfeeding, is of much significance. It serves to indicate that the phenomenon of bacterial invasion is to a degree conditioned by the extent of the internal resistance of the tissues and body fluids of the organism, and as resistance is lowered by the abnormal nutritional state which I have in general terms expressed here as arthritism, the invasion of disease-producing bacteria is not only more likely to take place in the first instance, but it is likely to become more grave and extensive when it does occur.

AN ILLUSTRATIVE CASE.

The following history of a case will illustrate my contention: On January 21, 1909, Mr. J. E. was brought to my

office by his dentist, Dr. Frederick Sauers of Philadelphia, for consultation. Dr. Sauers' history of the case is here given in his own words:

Mr. J. E., a man of about thirty-eight years of age, married, called at my office January 7th with the lower left central and lateral incisor teeth very sore. The case seemed to me like an abscessed condition, the lateral being the more painful of the two. I drilled into it with the expectation of finding a dead pulp, but I found it alive and in good condition. I then advised the patient to poultice the inside of the mouth, take a mustard foot-bath and six grains of quinin and go to bed.

The following day he called again, in great pain. I found conditions reversed, the central being more sore than the lateral. Thinking I had drilled the wrong tooth I drilled into the central, but found the pulp in healthy condition. The next day his physician was called; he prescribed a tonic and also treated for neuralgia, with no relief to the patient.

On January 11th I was called again, and found the patient in much worse condition, the two affected teeth very loose, gums swollen in front and back. I lanced the gums inside and outside; found but little pus. This gave the patient relief for a short time. The following day I was called and the patient requested me to extract the teeth. I extracted the central incisor, hoping that would give him relief, but without much success. The following day I extracted the lateral. The other teeth up to this time did not seem to be affected. Two days later, however, I found the two right incisors in precisely the same condition as the ones extracted had been. In the meantime the pain became so severe at times that his physician resorted to the use of hypodermic injections of morphin. I extracted the remaining incisors without any relief. A few days later I found the rest of the teeth in the lower jaw affected exactly the same as the ones I had extracted. The lower part of the face had been swollen since the third day of the trouble.

This completes the dental history of the case up to January 21st, the date when Dr. Sauers brought the patient to my office.

Upon examination of the patient I found considerable swelling of the tissues covering the outer aspect of the body of the mandible, and that the patient could open the mouth

only with difficulty. Around the entire alveolar border of the mandible the gum tissue was swollen from an accumulation of pus, and all of the remaining teeth were loose in their sockets. They were all otherwise sound. Near the internal angle of the jaw between the last molar and the ramus there was a determination of pus, and before evacuating the contents I requested Dr. Nathaniel Gildersleeve of the bacteriological laboratory of the University of Pennsylvania to see the case and come prepared to take cultures of the abscess contents. This was done at once with all precautions against contamination from the bacteria of the oral cavity. The abscess cavity was freely evacuated and afterward washed out with dilute antiseptic washes and a ten per cent. argyrol solution injected through the abscess tract, which extended from the socket of the lateral incisor to the third molar.

An inquiry was made into the general health status of the patient, and I learned from his wife that for several years he had had sugar in his urine, for which at different times he had been given treatment. I endeavored to get into telephonic communication with his physician but was unable to do so; I, however, reached the chemist who had been making the urinary analyses, and learned from him that his examinations had extended over a period of four or five years, and that they had showed from one to one and a half per cent. of sugar, some albumin, and occasionally a few casts, during that time. In view of this unfavorable history I insisted that the patient be placed at once in the hospital for treatment as to his diabetic condition and for appropriate care as to his local difficulty.

After some delay he was admitted to the University Hospital under the care of Dr. David L. Edsall as to his general condition and under the care of Dr. Cryer from the oral surgical standpoint. Notwithstanding the skilled and constant care to which he was subjected the patient became rapidly worse and died at 9 o'clock P.M. on February 7th, just thirty-one days after the date of the initial alveolar infection.

The urine records in this case present a typical picture of diabetes mellitus, with sugar, acetone, and diacetic acid. During the ten days while the patient was under observation in the hospital the fluctuation in the sugar content of the urine ranged from below 1 per cent. to 5 per cent. On January 27th and 28th it was but a trace. On February 1st it rose

to 5 per cent., dropped the next day to a trace, then rose slowly to 1 per cent., later to 3.75 per cent., dropped to 3.5 per cent. the day before death, and to 3 per cent. on the day of death.

Dr. Cryer informs me that there was a marked fluctuation in the flow of pus from the inflamed territory about the mandible corresponding synchronously with the fluctuations in the sugar content of the urine.

Dr. Gildersleeve's report on the bacteriological examination of the pus exudate is as follows:

Character of pus: Yellowish, creamy consistence, odor not offensive; contains some small caseous masses.

Microscopic examination: Appearance of pus as found in acute suppurative processes. Contains the following organisms: Streptococci, pneumococci, other micrococci appearing like the pyogenic cocci, and long slender spirochetæ. No tubercle bacilli could be found.

Cultures were made on agar and blood serum and the following organisms isolated: *Pneumococcus*, *Streptococcus pyogenes*, *Bacillus mesentericus* (of no significance).

The opsonic index of this patient was not taken, for the reason that the fact that diabetes mellitus causes a lowering of the opsonic index is already established.

We have here the record of an infection by ordinary mouth bacteria through the alveolar tissues upon a ground in which the internal resistance to invasion was lowered by systemic disease, viz, diabetes mellitus, a disorder which in our present knowledge of its etiology must be classified as belonging to the malnutritional diseases, as this paper has already endeavored to set forth. We must conclude that but for the lowered resistance of this case the invasion would have been but superficial or would not have occurred at all. Had it been but superficial and exhibited the clinical features which it possessed when first observed by Dr. Sauers it would have been quickly diagnosed as a simple case of pyorrhea alveolaris. As it was, however, the infection of the whole mandibular periosteum ensued, the pyorrhea developed into

a case of necrosis of the jaw, and terminated fatally.

From the mass of data now at our command with respect to the systemic relationships of these alveolar infections

it would appear to be unsafe, as it is certainly unwise, to continue to ignore them and to regard alveolar pyorrhea wholly as a local disorder amenable wholly to local treatment.

THE RATIONAL USE OF THE CAST GOLD INLAY.

By RODRIGUES OTTOLENGUI, M.D.S., LL.D., New York, N. Y.

(Read before the New York Odontological Society, February 16, 1909.)

AT the last meeting of this society we had the honor of listening to a paper from the distinguished writer, Dr. C. N. Johnson, in which he made a plea for "Rationalism in Dental Practice." The discussion drifted somewhat away from the theme, and largely took the form of a defense of the gold foil filling and a warning against the too free use of the cast gold inlay. The present paper was inspired by that discussion, for surely the time has arrived for us to discuss dispassionately the meaning of the words "the rational use of the cast gold inlay." The fact that the gold foil filling has served us so long and so well is no reason why we should deprive our patients of a better material and a better method, if there be one. Conversely, the fact that the cast gold inlay will certainly preserve many teeth where the gold foil filling would as certainly fail is no argument that gold foil and our plugging instruments should be relegated to the dark closet in the laboratory.

What, then, shall be considered a rational use of the gold inlay? An epigrammatic reply is easily formulated. "Wherever a cast gold inlay will meet all the requirements of a filling better than any other, the cast gold inlay should be used." To arrive at a final and definite rule for the selection or rejection of the gold inlay is, however, less simple.

Let us for a moment consider the purpose of filling a tooth at all, for upon

this premise must we eventually erect all our argument. Probably the first fillings ever inserted were placed in teeth merely to fill up the holes. Unto this day the "filling of the hole" remains as one of the prerequisites, but with the progress of dental science the filling of the hole has come to mean the absolute restoration of the form of the tooth, for we have learned that by such complete restoring of contours we not alone render the tooth fit to resume its normal functions, but we likewise minimize the danger of recurrence of decay in the tooth itself, and what is more important, the establishment of caries in its still unaffected neighbor. Anything short of complete restoration to a proportionate extent lessens the usefulness of the organ, and endangers its neighbor by inviting impaction of food.

Pausing here for a moment, we find that the cast gold inlay stands at the very head of the list as a filling with which perfect contour restorations may be made. I am ready to admit that we have operators who can, with gold foil, perfectly restore tooth-contours, but the skill required, the time needed, the painfulness of thorough polishing, combined with the tax upon the endurance of the patients, are all potent factors, which combined have made any restoration of more than one-quarter of a molar a rare and unpopular operation. Restorations in molars of one-half, two-thirds, and even the whole of a crown have become

both common and popular with the cast inlay process. Thus from this point of view we may erect one dogma, which cannot be refuted: "Just in proportion to the size of the restoration required is the cast gold inlay indicated." In connection with this, however, the demands of cosmetics restrict the application of the above rule to the bicuspid and molar region.

Of equal importance to the restoration of a tooth is its preservation. One essential demand for preservation is permanence. Permanence may be considered from three aspects:

First, durability of the material itself. This requirement is better met by the cast metal filling than by any other. Only a few of our most skilled operators have succeeded with admixtures of gold and platinum foils, whereas it is just as easy to make a casting of an alloyed gold as one with pure gold. Thus the cast inlay may be made of any alloy which the operator may select, in order to meet the requirements of masticatory stress.

Secondly, permanence considered from the mechanical standpoint—retention in the cavity. In last month's discussion a distinguished *confrère* mentioned that he had seen a handsome gold inlay that had been "sneezed out," and that he had seen many beautiful gold foil restorations that were "not to be sneezed at." To that gentleman I wish to say that I doubt if the inlay which was "sneezed out" was made by a man capable of making foil restorations which are "not to be sneezed at." I would say, on the contrary, that the dentist who inserted the inlay which was cast out by a nasal paroxysm probably would insert foil fillings which would be better out than in. There is, however, an important factor to be considered here. There may be many good foil filling operators who will fail at first with the gold inlay, because of a lack of the knowledge of the proper cavity preparation necessary for their retention. It is not my purpose tonight to take up the subject of cavity preparation, as that would lead me away from my real theme. I must say, however, that there is no cavity in which a foil filling may be retained

in which a gold inlay cannot be retained with equal permanence, and, moreover, I may add that just in proportion as cement is relied upon to retain cast inlays, will such inlays be liable to be "sneezed out." The cavity for an inlay should be prepared with due regard for the mechanics of retention, and the cement should be used merely to seal the joint.

This brings us to the third aspect of permanence, resistance to recurrence of decay, and here I must ally myself with those who believe that the cemented filling is the best tooth-preserver. But I would add that an old axiom in mechanics, "The less cement, the better the joint," is not only applicable in gold inlay work from the purely mechanical side, but it is of even greater importance from a therapeutic point of view. It is manifest that even though our inlay is not in one sense retained by the cement, nevertheless it would not be retained at all without the cement. Consequently it is of prime importance that the cement shall not disintegrate. If we study the disintegration of cement, in whatever way it may occur—and I believe that it may be brought about in more than one way—this at least I think is beyond dispute, that cement thoroughly protected from the fluids of the mouth will remain intact and unpolluted indefinitely within a tooth-cavity. I have seen cement which had been thus imprisoned for ten or more years, which was so hard as to almost resist steel-cutting instruments. It follows, therefore, that the disintegration of the cement will be dependent entirely upon the area of its exposed surface. This brings up a question of tremendous importance.

I believe it to be true that the closer the adaptation of a filling to its cavity walls—the cavity preparation supposed to be an ideal one—the more certainly will recurrence of decay be inhibited. Secondly, I believe that the most skilful gold foil operator in the world cannot adapt a gold foil filling as closely to the walls of the ideal cavity as even a moderately skilled inlay worker can fit his cemented inlay to an equally well prepared

cavity. Thirdly, I believe, for the above reasons, that the cemented gold inlay will preserve a tooth better than a gold foil filling.

I do not, however, have the same faith in the preservative quality of the cemented porcelain, though I do not at all mean to decry the porcelain inlay, to which I allude tonight only for one reason. The use of the porcelain inlay undoubtedly, and almost unsuspectedly, has lowered the standard of requirements for a gold inlay. The porcelain inlay being made within a metallic matrix, which is removed before the setting of the inlay, places it in a class entirely apart from the gold inlay. Yet the fact that the porcelain inlay is supposed to be satisfactory has blunted the vision of many to the defects of many gold inlays that have been and I fear still will be used.

To make myself clearer, let me point out that the porcelain inlay, made within a matrix which is removed, necessarily is that much short of an absolutely accurate fit—short of such absolute fit as can and should be obtained by casting gold. But men have come to look upon the porcelain inlay as fitting well enough, and consequently, when they make a gold inlay which fits as well, or let me say as badly, as do their porcelain inlays, they draw the deduction that it also is good enough. But it is not. The majority of porcelain inlays are used in places where they are not subjected to much stress. Where they are subjected to stress, as for example corner contours in incisors, we find the problem of retention just that much more difficult. A similar incisor restoration could be made with cast gold with much greater certainty of attainable permanence, the reason being that the cast gold inlay may and should have a closer adaptation than is possible with porcelain. With porcelain we rely more upon the cement for retention than we should with the cast gold inlay. This leads us to use our cement mixed more thickly for porcelain than it should be used for the gold inlay.

I have pointed out that the preservation of the tooth from recurrence of decay will depend upon the presence of the

cement, and that the less cement there is in the joint the better. To obtain the minimum of cement, our inlay should fit as accurately as possible, and the cement should be as thin as is compatible with setting. The metallic inlay thus has three important characteristics which distinguish it from the porcelain inlay. First, absolute adaptation to the cavity; second, possibility of using the cement thinner, which means less cement in the joint; third, strength in the mass, and especially along the margin, which will permit of great stress during setting, thus forcing out all cement not needed for sealing the joint. To this is to be added the possibility of burnishing or dragging the edges, so that in many situations the cement may be completely protected from the oral fluids.

The inaccurate yet apparently satisfactory fit of the porcelain inlay has, in my opinion, much to do with the adoption of cheap and really inadequate machines for making cast inlays. Many men have said to me, "With my machine I can make inlays that fit perfectly." But specimens shown in evidence of this statement have proved that the speaker's idea of the meaning of the word "perfectly" was quite different from my own interpretation of that word. With such machines, and with the inaccurate modes of work so prevalent, it is simply impossible to make a "perfectly" fitting inlay for a cavity with three walls remaining, especially if they be properly shaped.

I have just used the phrase "inaccurate modes of work." Let me explain what I mean. A cast gold inlay can be made which will fit the cavity for which it is intended with absolute accuracy. In order to accomplish this in every instance, and with equal certainty in all cases, many things are required. First, a known quality of gold, either pure or with a definite proportion of alloy. The man who melts up any old scrap for inlays need never hope for results of the first rank. Second, a reliable casting machine, one so reliable that failures may always be traced to some cause other than the machine itself. Many such failures have been charged to the machine,

when in reality it was the man operating the machine who has been at fault. Third, a perfect investment. By this I mean an investment that neither expands, shrinks, nor cracks. But even with such an investment, a definite quantity of investment material should always be mixed with a definite quantity of water, and stirred for a definite number of seconds. It should be allowed to set a definite time, and should be heated up with exactly the same heat for exactly the same length of time on all occasions. This is what I mean by accurate methods, and by such methods gold inlays may be made which will require a minimum of cement, and will yield the maximum results in permanence viewed from all three of the aspects enumerated, viz, durability, retention, and preservation of the tooth from future caries.

I ask your attention now to another aspect of this great inlay question. Foster Flagg once announced that "In proportion as a tooth needs saving, gold is the worst material with which to make the attempt." In an extreme sense, this of course is true, because the larger the cavity the more difficult proportionately is it to make a perfect gold foil filling, and it was of the foil filling that Dr. Flagg wrote. This, however, is true of the gold inlay to a much more limited extent. While it may be true that it is more difficult to make a large gold inlay and have all margins perfect than it is to make a small inlay, the perfect gold inlay nevertheless can be made in cavities so large and so located that the gold foil filling would be an impossibility. Such teeth were saved or said to be saved by Flagg with plastics. I shall not go deeply into the question of amalgam, but I do wish to say that amalgam has not accomplished half of the miracles that its advocates have claimed for it. Amalgam has been a true friend to the competent, conscientious dentist, but—I say it with sorrow—amalgam has been the best friend to the incompetent and the charlatan. It is true that in skilled hands amalgam has saved many wrecks of teeth which were beyond the saving grace of gold foil.

But it will do so no more, because the men who have had the skill, the patience, and the perseverance to make large restorations with amalgam and to make them perfect as to margin, perfect as to contour, and perfect as to finish, will find in the cast gold inlay an easier, a surer, and a better road to a more permanent result. Consequently, I would alter Dr. Flagg's maxim and say that "In proportion as a tooth needs saving, the gold inlay must be our best reliance."

Teeth which need "saving" within the limitations of Dr. Flagg's use of the term are teeth which are in danger of loss. This may be tersely put as "teeth afflicted with deep-seated caries." Deep-seated caries brings us to another and most important problem—the true limits of the caries. I believe that the dental profession is rapidly passing away from the mere mechanical filling of teeth, and is progressing toward the purely therapeutic treatment of teeth with the aid of filling materials. We are no longer "tooth carpenters," but avow ourselves to be "tooth doctors." To deserve this title we must comprehend what tooth-disease is.

I shall not go deeply into the causation of caries, but I desire to touch on one phase of it, because it has to do with the rational use of the inlay.

Black in his latest work on "Operative Dentistry" says: "Caries in its simplest expression consists in a chemical dissolution of the calcium salts of the tooth by lactic acid, followed by the decomposition of the organic matrix, or gelatinous body, which in dentin is left after the solution of the calcium salts." Later on he says: "The solution of the calcium salts is always considerably in advance of the decomposition of the organic matrix, leaving a zone of softened material between."

Caries is caused by a growth of micro-organisms, primarily on the surface of the enamel, and the production of lactic acid during that growth. The enamel is not permeable by micro-organisms, but the enamel rods are held together by a cementing substance which is more easily dissolved than the enamel rods them-

selves; but before the rods fall apart, thus forming a true cavity, the affected enamel appears to be of a white chalky consistence. This whitish, partly decayed enamel is often not readily discernible if the tooth is wet. Therefore I depart entirely from those who claim that one advantage of the gold inlay is that the rubber dam may be dispensed with. The dam must be used where it is at all possible, and the cavity must be prepared with the tooth kept dry. It is only by this means that the margins may be laid within an area of unaffected enamel. I cannot lay too much stress upon this. Much recurrence of caries has been attributed to faulty fillings, and will hereafter be attributed to faulty inlay work, which really should be chargeable to faulty or careless cavity preparation.

The enamel having been fully penetrated and a true cavity having been created, the ingress of micro-organisms is permitted, and caries of the dentin ensues, as described in the passages quoted from Black. It only remains to be said that the micro-organisms actually enter the dentin and are consequently present in the decaying mass. This brings me to the subject which I wish to discuss with you.

All the authorities practically agree that the action of the solvent acid is somewhat in advance of the real decomposition of the organic matrix of the dentin. Of course when the final decomposition does occur, the cavity contains the thoroughly disorganized débris which are the result of complete caries. But we have also all seen the matrix to be so resistant that it retains its form, though it be thoroughly softened, so that we may peel it away in what is commonly called "leathery" masses. Here this question arises: Let us suppose that we have removed all of the carious material that is removable with hand instruments, what of the dentin beyond? Shall we call it normal? Hardly, because in that event there would be a definite line of demarkation between the healthy and the diseased dentin. If the dentin which remains is not absolutely normal, the question arises, Is it to be considered

as "infected," or merely "affected," and what shall be the treatment? I have presented the question to several authorities, and will give you their replies.

Dr. Black writes as follows:

As nearly as I can understand what you write, you want to know what I would use in a cavity that must be sealed for a day or more before inserting a gold inlay, after the preparation of the cavity.

I may say that I should use eucalyptol to moisten the walls of the cavity and should fill it firmly and solidly with gutta-percha. There is an affected area deeper in the dentin beyond the extension of caries. There are no micro-organisms in this area and it is not an infected area. If you will look over the photographs in the first volume of my recent work on "Operative Dentistry," in the section devoted to the explanation of caries, you will find that what I have called the "hyaline area of Tomes" often extends to the pulp of the tooth when caries has made very little advancement in the dentin. This of course is an affected area, but is not an infected area. Indeed, we may remove practically every micro-organism from a carious cavity with excavating instruments without cutting away any tissue not yet softened. The affected area of which I speak as having extended so far beyond the pulp, or to the pulp, is not a softened area. I should not use any medicament whatever in such a cavity for the purpose of disinfection, deeming it entirely unnecessary, but I should dislike very much to fully prepare a cavity for an inlay, and wait one or two days before placing a gold inlay. The walls of the cavity would not be in the best condition. The inlay should be put in before the patient leaves the chair.

As there may appear to be a divergence of opinion between Dr. Black and the other gentlemen whom I shall quote, I wish to say that this is possibly due to my having expressed myself poorly in my letter of inquiry. Dr. Black is evidently speaking of the most thorough removal of decay, and in doing this he tells us that all micro-organisms are removed. He then refers to his wonderful photographs of "hyaline areas," which photographs were once beautifully shown in this room, and are familiar to all of you. He calls this an "affected area," but says it needs no treatment by medication.

His statement that an inlay should be inserted on the day on which the cavity is prepared would interdict the utilization of the inlay principle in dentistry. Even if we grant that the complete removal of all infected dentin would leave us a dentinal surface which, though being "affected," would not require treatment, how many of us can be reasonably sure that we do accomplish this in every case? It would almost require microscopic examination to be sure. Therefore, in spite of Dr. Black's advice to insert the inlay on the same day, I shall maintain that one of the prime advantages of the cast gold inlay method is that at least twenty-four hours usually elapse between the cavity preparation and the setting of the inlay, and I recommend that advantage be taken of this period for treatment of the dentin.

The following is a letter from Dr. I. N. Broomell:

Replying to your letter of January 28th in which you ask for my opinion regarding sterilization of cavities before inserting gold inlays, I have the following reply to offer.

There is little doubt that micro-organisms penetrate the dentin beyond the point of actual decalcification of the tissue. This area is infected and therefore necessarily affected. I believe, however, if all the *visibly* affected tissue is removed, followed by thorough dehydration, and this in turn followed by hermetically perfect filling, that there is little chance for recurrence of decay.

As to the best agent for sealing in the cavity, if this is deemed desirable, I would prefer hydronaphthol, as it is non-irritating and non-toxic, sealing this in with melted wax, being careful, of course, to keep the cavity absolutely dry.

The following statement comes from Dr. J. P. Buckley:

Your letter at hand. In reply, I will say that there is room for debate as to whether the area beyond that which is mechanically removed in a carious cavity is infected or affected tissue. I should consider it infected tissue as long as the by-products of bacteria are present, even though the germs were not present, and whether or not the bacteria are present in this zone constitutes the debatable ground. However, the demand for sterilization remains the same, as thorough sterili-

zation includes the destruction of by-products as well as simply killing the germ.

In reply to your query as to what remedy I consider best for this purpose, I will say that thymol has a peculiarly favorable action when sealed in contact with infected dentin. I like a remedy, then, which contains enough thymol to produce the desired result and no other constituent that would be liable to irritate the pulp. For some years past I have been using what I call modified phenol, a formula for which follows:

R—Menthol,	3j
Thymol,	3ij
Phenol (95 per cent.),	f3iij. M.

Sig.—Use where indicated.

This remedy is an anodyne, and the thymol which it contains will permeate the dentin and sterilize the tissue. If the cavity is large, and if it is necessary to insert a cement base before the impression is taken, the sterilization would necessarily have to be done before placing the cement base. This might defeat the object you have in mind in your paper.

Dr. Edward C. Kirk writes as follows:

Most people in discussing the question of caries overlook the double nature of the process. It takes many years of hard hammering to get an idea fully developed in men's minds, and what the profession knows today about the etiology of dental caries is about one-half of the problem. That is to say, they know that the first stages of decay are produced by a ferment action of a certain type of bacteria known as *B. acidi lactici* upon carbohydrate food, whereby lactic acid is produced which decalcifies the tooth-structure, but the decalcification is only the first chapter in the process. The decalcification being completed there is exposed the organic matrix of the dentin, which is a nitrogenized body or compound, and this undergoes decomposition by a totally different class of germs, namely, the putrefactive organisms, those which have the property of liquefying and digesting gelatinous substances. Very well. With these two processes in mind, it is quite possible to have a decalcified dentin which is not wholly dead. That is to say, it may contain to a considerable portion of its depth, looking from the pulp outwardly, living dentinal fibrillæ, and such dentin may be decalcified, or to use your word, "affected," and in that stage be not wholly penetrated by micro-organisms. Miller himself has shown, I think, that the acid responsible for decal-

cification exerts its influence in advance of the physical entrance of the bacterium. You have observed this condition clinically when you have attempted to remove a stratum of so-called leathery decay from the bottom of a deep cavity and found the underlying strata of this leathery or horny mass highly sensitive to touch with an excavator.

For the foregoing reason I am inclined to believe that there is a zone of decalcified or partly decalcified dentin in certain classes of decay which has not yet been penetrated by bacteria, or certainly at least by those bacteria which are concerned in the liquefaction of the dentin matrix.

Now, from the practical standpoint, I should say that it is not a question of using either a germicide or an antacid, but rather of using an alkaline germicide, of which there are many. Lysol, for example, and its kindred preparations, or sodium dioxid. In short, I would hit that kind of a target with a double-barreled gun, one which would reach the acid and the microbe with equal efficiency.

Let us apply these facts as to the treatment of deep-seated caries. I allude to those cavities in which we were taught to operate gently and to proceed cautiously, for fear that we might "expose the pulp." Something was said last month about the too prevalent destruction of living pulps, and in the same discussion I bemoaned the fact that too often pulps are left in which were better removed. Carrying in your mind a picture of the conically-shaped hyaline (affected) areas pictured by Black as reaching to the pulp even when the true caries itself may have progressed but half the distance from the surface to the pulp-chamber, and bearing in mind the decalcification and penetration of the dentin by micro-organisms, which is in advance of the totally carious dentin, I ask you to imagine what the microscope would show you within that dentin, which you leave because its removal would expose a pulp. Here, certainly, we are dealing with a dentin which is not only affected but infected. Such cavities in the past have been often swabbed with an alleged sterilizing agent, covered with a so-called cap, and then filled with a foil filling, beautifully executed. This is the work of the tooth carpenter rather than of the tooth doc-

tor. Later on the patient complains that "heat and cold hurt." The dentist declares that "It will stop hurting in a little time." In a little time, perhaps it does stop hurting and the patient is contented, whereas he should be most discontented, since probably the absence of pain is due to the death of the pulp. Still later, when trouble comes, and the dentist removes his beautiful gold foil filling from that terribly sore tooth, he tells the patient, "I did the best I could to save the pulp, but it died of thermal shock."

At the last meeting I declared that this has often been said, and that while I did not deny the possibility of death of the pulp from thermal shock, nevertheless no one had positively proved it. Since then I have read a chapter on this subject by Dr. Black, which more than ever convinces me of the possibility of pulp death from irritation caused by thermal shock, but I am quite as sure now as I was at the last meeting that the majority of pulps which have died under fillings have not been killed by thermal shock, but have died from disease caused by infection. Such pulps are either already infected when the dentists "make an effort to save them," or they become infected from the partly decalcified and infected dentin which the so-called "conservative" dentists leave in the cavity, especially when no adequate effort is made to sterilize the infected layer.

Speaking of the micro-organisms engaged in the production of caries, Black says: "The fungus is facultative anaerobic, growing ordinarily in the presence of oxygen, but having the faculty of growing quite well without oxygen. It grows well in culture media when all oxygen is removed, and therefore grows quite well when shut up in a deep cavity."

I do not know whether that distinguished author means that these organisms would thrive for a long time in a cavity hermetically sealed with a properly made gold inlay, but it is more than probable that they might penetrate to the pulp before being destroyed by the mere presence of the filling mass.

The obvious deduction is, first, that

absolutely all decalcified dentin should be removed prior to filling, even though by so doing the pulp be uncovered. Let me not be understood as advocating the removal of all pulps prior to filling teeth. I merely wish to show that the conservatives in the past have been conservative in the wrong direction, and that they have saved or tried to save too many pulps which might better have been removed under aseptic precaution than later when putrescence had supervened.

Nevertheless we shall still meet doubtful cases in which it will be decided to "take a chance," and leave the pulp in. Here, in one of the most important emergencies which can possibly arise, the cast gold inlay is pre-eminent, for it is the only means by which we may insert a perfect, resistant yet hollow filling. In these cases I recommend making the wax model for the inlay of the full depth of the cavity, and then forming a hollow box on the pulpal side. This may be most conveniently done with the ingenious device made for that purpose by Dr. Roach, but those who have no fountain spittoon siphon may use carving tools, or a sharp bur in the engine, the wax model being held under a stream of cold water from a water cooler during the carving.

In setting such hollow gold inlays I think it has been the common custom to allow the cement to enter the hollow or box. This I think is a mistake. In my experience cement setting in an inclosed space of this character becomes more than ordinarily hard, and it would be almost as difficult to drill through such a mass of cement as to drill through the gold itself. The hollow in the wax inlay should be so carved that when the wax is held up to the window a ray of light will pass through. This will assure us of a very thin spot in the gold, which should be at that point in the filling which will be closest to the pulp. The hollow or box should be made as large as is consistent with retention. Just prior to the setting, this hollow should be filled with gutta-percha. It will be argued by some that the gutta-percha might swell and thus cause irritation to the pulp. I do not fear this, because I do not know

how moisture can reach gutta-percha so well protected by gold on all sides but one, and by a stratum of cement at that point nearest to the tooth itself. If, however, anyone should have some fear of this sort, the hollow may be filled with temporary stopping, wax, paraffin, or some other similar substance. Two objects are to be observed: First, the hollow being large, and filled with a soft material, and a thin spot being present in the gold, in case of need the pulp may be entered with scarcely any pressure. Secondly, the mass of gutta-percha will materially aid in preventing thermal shock. Thus, in that most important of all cases needing filling, viz, deep caries where the pulp nevertheless may be conserved, the cast gold inlay becomes the very best therapeutic agent, since it affords opportunity for sterilization of the dentin in advance, protection of the pulp from thermal shock, and comparatively easy entrance to the pulp-chamber in case of need.

There is another class of cavities in which the hollow inlay, filled with gutta-percha is equally useful. I allude to teeth in which putrescent pulp-canals have been treated. In such teeth of course, theoretically, we cure the disease before we fill the canals, and after once filling such canals we never require to gain access to them again, or to refill them. This of course is true in your practice and in my practice, but it may not be true in all practices, and therefore it will not be a bad method to fill such teeth with the hollow inlay. If no trouble supervenes, the hollow inlay is quite as good as the solid one, and if by chance or mischance one ever should desire to enter the pulp-canals again, ready access is afforded.

In conclusion, while I think that I have described the rational use of the cast gold inlay, I presume that I am also expected to state rather more definitely the line which separates the inlay from the foil filling. Just as I believe that extremely large cavities cannot perfectly be filled with gold foil, especially when any great area of the margins comes to lie below the gum, so I also believe that

there are many small cavities for which it would be difficult or impossible to make a really perfect inlay, without such enlargement as would be unwarrantable. Such cavities I should fill with gold foil,

but I should prefer the gold inlay for all other cavities. It is of course also understood that I am restricting the employment of the gold inlay to bicuspid and molars.

PERFECT CONSTRUCTION OF A RIM FOR A GOLD PLATE.

By FARRIS S. SAWAYA, D.D.S., Baltimore, Md.

A CAREFUL study of the several methods described in different books for adjusting rims to gold plates would reveal to the practitioner the following difficulties and disadvantages: (1) If the rim is to be soldered to the plate before soldering the teeth, it is exceedingly difficult and sometimes impossible to burnish such rims to fit accurately the gingival edges of the teeth, besides there being the great risk of lacerating the gums while burnishing. (2) If the rim is to be soldered after soldering the teeth to the plate, it is very easy to lacerate the gingivæ around the teeth, and it is difficult to fit the rim to the gingival edges of the teeth and hold it in its proper position even with investment, especially when the rim is narrow; besides, the plate may warp, and then the retentive power and perfect adaptation of the plate is impaired in proportion and the denture is rendered useless.

A denture without a rim and with perfect adaptation to the gum, or to the gum and palate, is superior to one having a badly fitted rim with shattered gums and imperfect adaptation to the mouth.

The method here described of making, fitting, securing, and soldering a rim to the denture is perfect, and is entirely free from the danger of lacerating the gingivæ. Even though it takes a little longer time to accomplish the operation than it would with any other method, it is the most satisfactory and perfect, fulfilling

the aim of every practitioner who is willing to sacrifice a little extra time in order to obtain the best results.

After swaging the plate, fitting it to the mouth, and grinding the teeth to articulate with their antagonists, fit the plate; secure the teeth in their positions on the plate by wax on the palatal or lingual surfaces, then run plaster all around the buccal and labial surfaces of the teeth and the portion of the plate which extends beyond the gingival edges, leaving the palatal portions of the teeth and plate uncovered. This plaster support is adopted to afford a guide to insure the perfect readjustment of teeth after their removal. Before the plaster hardens, pass a thin piece of metal up and down on the median line of that plaster investment to divide it into two portions, thus facilitating its removal. After the plaster hardens, boil the wax off the palatal or lingual surface, when the plaster support is removed in two pieces, each containing half of the number of teeth. Each tooth is then removed from its place and backed in the usual manner; pins are riveted; then each tooth is invested separately and soldered, thus saving time in finishing the plate after complete soldering. When the teeth are all soldered individually, they are taken off their investments, washed, and put in their places in the plaster support; then the supports are readjusted to the plate, and the teeth are secured in their proper places on the plate by wax on the lingual or palatal

surfaces; the plate then is dipped in cold water to harden the wax, and the plaster supports, which are of no further use, are removed in two pieces.

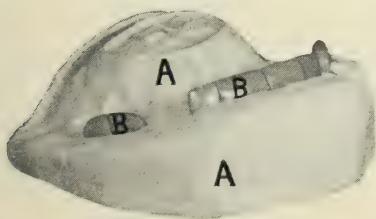
FIG. 1.



A, Plaster investment supporting the teeth, B B, in their position on the plate, C.

Then the inferior palatal surface of the plate, and all the teeth as far as the middle of their labial surfaces, are covered with plaster (Fig. 2), which should be a quarter of an inch thick

FIG. 2.

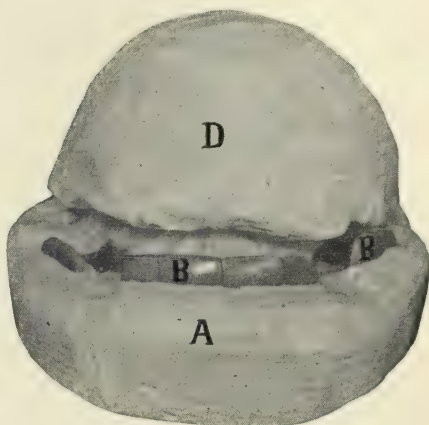


The teeth, B B, in their proper position in the plaster investment or die, A, after the plate is removed.

all around so that it will not break; at the palatal portion this plaster should be thicker. After the plaster hardens, the plate and this investment, only, of plaster are boiled to soften the wax which holds the teeth to the plate, then the plaster containing and supporting the teeth is separated from the plate by

passing the edge of the knife between plate and plaster. The plate is laid aside, then the plaster containing the teeth (Fig. 2) is washed well to remove all traces of wax, and after it is dry the surface that was lying against the palatal surface of the plate and the lingual surfaces of the teeth (Fig. 2), which were resting against the labial and buccal portions of the plate, are coated with oil as a separating medium; then the plaster die is filled with plaster up to the gingival edges of the teeth (Figs. 3 and 4), the

FIG. 3.



A, Plaster die with the teeth in position. D, Plaster investment or counter-die, partially removed, holding the teeth during the grinding.

plaster being laid on thickly enough in the center so that it will not break.

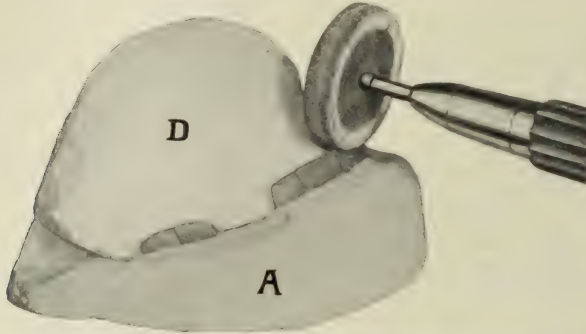
After the plaster hardens the whole is put into warm water, then separated in two portions (Fig. 3); the first portion, containing the teeth, acts as a die of plaster; the second is only a counter-die, and its function is to prevent the displacement of the teeth in the operation now to be described.

Trim slightly the edge of the plaster counter-die where it meets the gingival edges of the teeth, so as to leave them free on both sides; then grind these gingival edges (Fig. 4) to make them all level and to obtain the desired inclination and outlines of such edges as

are peculiar to the particular case; the plaster counter-die is removed after finishing the grinding, and the plate is fitted back into the place of the counter-die (Fig. 1) to see if the edges are

is put back in its place, after it has been well cleansed with acid (Fig. 6). While the plate and teeth are in their positions in the plaster die the caps are secured to the margin of the plate by wax; the plate

FIG. 4.



Counter-die of plaster, D, in position on the teeth and plaster die, A, during the grinding.

properly ground in relation to the gum margin of the plate, which depends entirely upon the individual case.

Having obtained the proper relation and the desired width between the gingival edges of the teeth and the gingival margin of the plate, the next step in this procedure is to make the rim, which is constructed as follows:

The teeth are removed from the plaster die, care being taken not to break the plaster—it might be necessary to remove a little of the plaster from the lingual or palatal surfaces around the teeth to facilitate their removal. Each tooth is then fitted with a cap of platinum foil 1/1000 of an inch around the gingival edge of the tooth (Fig. 5, B, G); this capping should extend about one-eighth of an inch on the anterior and posterior surfaces of the tooth, the object of this extension being to hold the teeth in the plaster during the soldering. This cap is best made and is accurately fitted by directly swaging the platinum foil on the gingival edge of the tooth by means of the Coates swager (Fig. 5, E); each cap is then trimmed even with the mesial and distal sides of each tooth. The teeth with their caps on are placed back on their model—plaster die—and the plate

and plaster die are then put into cold water to insure hardness, after which the plate can be removed; with it come off the caps (Fig. 7) in the positions intended for them when the plate is fin-

FIG. 5.



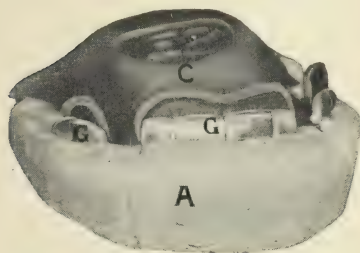
E, Coates swager. B, Tooth. G, Platinum cap swaged directly on the margin of the tooth.

ished; the plaster die still containing the teeth is laid aside.

Then the plate with the caps secured to it is invested with an investing material, such as is used in investing crown and bridge work, leaving free the portion that is covered with wax while the remaining portion of the plate is well covered with the investment; after this

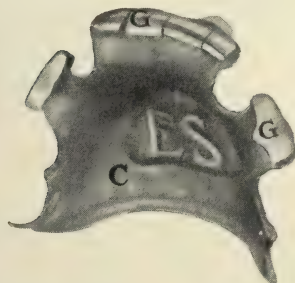
has hardened, the wax is either washed out with boiling water or removed by

FIG. 6.



Platinum caps, G G, in position on the teeth, while the teeth and plate, C, are put back in position on the plaster die, A.

FIG. 7.



C, Plate, with caps, G G, held in position by wax, ready to be invested and soldered.

FIG. 8.



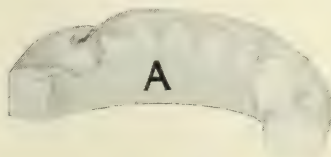
X, Plate. N, Solder flowed flush between the margins of the plate and platinum caps. B, Teeth fitted in the caps and held in position on the plate by wax, ready for final investment and soldering to the plate.

heat. The whole investment is heated, and solder is flowed to fill up the space between the platinum caps and the margin of the plate, making it flush (Fig. 8,

N). When the soldering is finished, the investment is cooled gradually, after which the plate is taken off and washed first with water, then with acid to cleanse it.

This operation secures the most perfect adaptation of the edges of the teeth

FIG. 9.

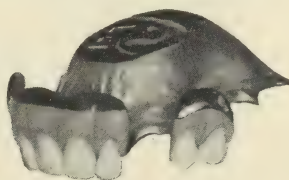


Die, A, cut off to facilitate its removal after readjusting the teeth to the caps, after they are soldered.

to their proper places in the platinum caps, besides avoiding the risk of lacerating the gums during the soldering or the burnishing of the rim—neither of these processes being necessary if this method is followed.

To secure the teeth back in their proper places in the caps, the palatal

FIG. 10.

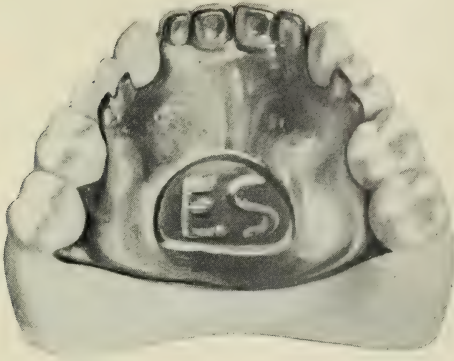


Plate, finished and polished. Labio-buccal view, showing the perfect adaptation of the rim to the necks of the teeth.

portion of the plaster die that contains the teeth is cut off as far as the lingual or palatal surface of the teeth (Fig. 9), and the plate, with the caps soldered to it (Fig. 7), is readjusted to that portion of the plaster die which holds the teeth. The teeth are then secured to the plate, in their caps, by wax (Fig. 8, B), and after the wax has hardened, the plaster portion that holds the teeth is re-

moved (to facilitate its removal, it can be cut in two pieces at the median line

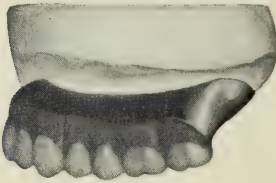
FIG. 11.



Plate, mounted on the model, finished and polished, showing the palatal surface.

by a saw), and the plate, with the teeth in their proper positions, is invested in

FIG. 12.



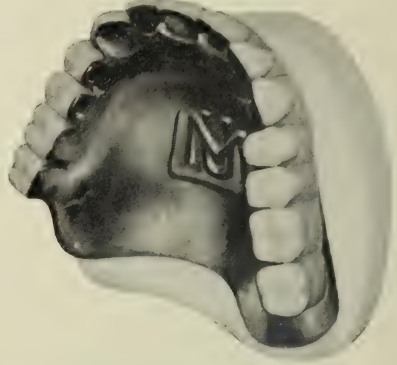
Another full upper denture, showing the adjustment of the rim to the teeth, after finishing.

an investing material, which is allowed to harden. Then the wax is washed off, the plate is heated and soldered like any

other gold plate, and then polished and finished (Figs. 10-13).

This method gives the best results and the most perfect adaptation of the rim to the edges of the teeth, avoiding all the disadvantages connected with other methods for making the rim, because the edge of each tooth is fitted by a very thin piece of platinum swaged to it

FIG. 13.



Palatal view of full upper denture after finishing.

directly and fastened to the plate in its proper position, which insures the proper replacement of the edges of the teeth after the caps are soldered.

When the plate is ready to be finished, these caps and the solder which holds them to the plate are filed and trimmed flush with the teeth, with a motion directed always toward the incisal and grinding surfaces of the teeth, using a very fine file to avoid any roughening of the surfaces of the teeth.

NEW FORM OF SECTIONAL CROWN FOR THE RESTORATION OF BADLY BROKEN-DOWN MOLARS.

By CHARLES W. RODGERS, D.M.D., *Dorchester, Mass.*

THE principle of the new form of sectional crown for the restoration of badly broken-down molar teeth, which represents a new feature in crown and bridge work, is suited for numerous

The results of former attempts at restoring this class of decayed teeth to a prime condition of usefulness had been unsatisfactory. Considerable thought was therefore given to the case in order to

FIG. 1.

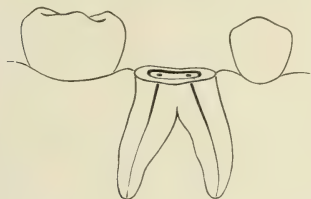
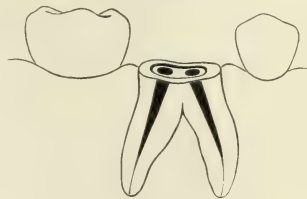


FIG. 2.



modifications. In the following description, however, only the restoration of molars will be considered.

The first practical case was made and placed in the mouth in January of the current year. It is giving excellent service, and in the author's opinion repre-

evolve some plan of procedure which would be easy to accomplish, especially if the operator's hands are not particularly skilful, and give more satisfactory results.

In studying this case it was realized that a method of placing posts in both

FIG. 3.

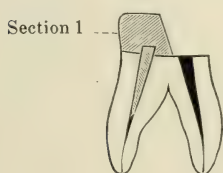
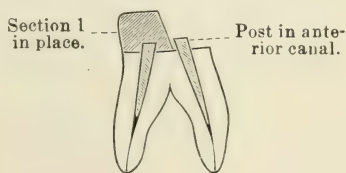


FIG. 4.

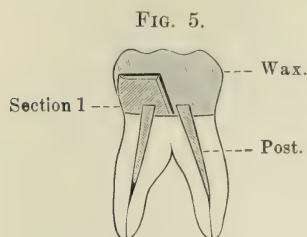


sents a permanently successful appliance. The patient had a lower right first molar the entire crown of which was missing, the caries extending below the gum margins all around, with a deep depression in the region of the pulp-chamber. The roots diverged as is normal in these teeth. (Fig. 1.)

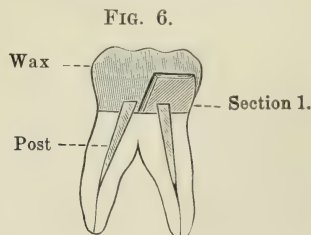
canals was required, the posts to have a solid attachment which would build up the lost parts, and at the same time tend to prevent the roots from being separated by the force of mastication. The following plan was then evolved, which solved the problem in a most pleasing manner:

The caries was first removed, and the

root-canals were enlarged for the reception of tapering posts of a good size. (Fig. 2.) Then a platinum-iridium post was placed in the posterior canal, and in-



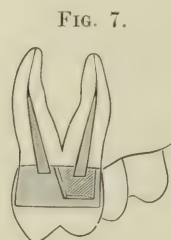
lay wax was pressed into the cavity and about the post-end. The wax was built up almost to occlusion and contoured to the shape indicated in Fig. 3. The wax was then invested and cast with acolite—a low-fusing casting metal. Section



1, as seen in Fig. 4, after completion was placed in position in the tooth, and a platinum-iridium post was inserted in the anterior root-canal. Next, the anterior face of section 1 was ground so as to be parallel to the plane of the anterior root-canal as indicated by the projecting post-end in Fig. 4.

Placing section 1 in position tem-

porarily and the post in the anterior canal, inlay wax was built up around the post and over section 1 so as to cover the occlusal surface and overlap it at the distal occlusal margin. The patient was then asked to bite, whereby a good occlusal surface was secured. The wax was then trimmed and carved to contour and shape so as to reproduce a natural tooth as nearly as possible. (Fig. 5.) The wax was removed, together with the post,



and invested and cast with 23½-k. gold. Sections 1 and 2 were polished nicely, the tooth was protected from saliva with cotton, and dried out with absolute alcohol and hot air. Then section 1 was set in place with cement, and section 2 was inserted in its proper position, using the same mix of cement.

The principle, as stated before, is suited for various modifications which will suggest themselves to anyone who attempts to apply this method. If it is thought desirable to make the anterior section first, Fig. 6 will illustrate the method of procedure.

Fig. 7 shows how a base may be made for an upper first bicuspid which has been badly broken down and which it is desired to use as a bridge abutment.

TREATMENT OF PALATO-PHARYNGEAL SYMPHYSIS BY IMMEDIATE PROSTHESIS.

By Dr. C. J. KÖENIG, Paris, France.

PALATO-PHARYNGEAL symphysis is not a rare affection, and is a subject interesting alike to physicians, surgeons, laryngologists, and dentists. Tertiary syphilis is its most frequent cause; however, it may be due to diphtheria, scarlet fever, lupus, etc. It is very rarely traumatic. In most cases it is not complete, for there exists usually a small opening between the buccal and nasal pharynx allowing the passage of a little air, but the latter can be forced through only with great effort. The opening may be only a virtual one—that is to say, it may allow the passage of a probe, no air, however, being able to pass either by inspiration or expiration, the palate forming a valve which closes both ways.

Having had occasion to see a little girl eight years of age who was in the latter condition, I set to work to remedy that condition with the desire to improve whatever methods were used in the treatment of this affection.

The only procedure I could find described in the special text-books upon rhino-laryngology was the method of Hajek. After incision of the soft palate transversely, the wound is dilated by means of a Voltolini velum-tractor, and as soon as possible by means of Hajek's dilator, which is introduced daily in the beginning, later at intervals, gradually increasing the force of the dilatation. According to Moritz Schmidt,* the patient can endure this dilatation for hardly one minute in the beginning, but very soon for thirty to sixty minutes. He cured a case, where the symphysis was due to lupus, in *six months*. He also

says he cured a case due to syphilis "just as quickly."

In the case that came under my care, I not only thought that such a procedure would not be followed by any beneficial or permanent result, but also that a more extensive operation followed by an immediate prosthesis could alone give satisfaction, with less loss of time and less expense to the patient.

The little girl whose case spurred me on to such an attempt is, as I said above, eight years of age. Her nasal obstruction was complete and was of traumatic origin—probably operative, for, since adenoids and tonsils were removed four and two years ago respectively, she has been unable to pass air through the nose either in one direction or the other, while previously she could do so. As a result of mouth-breathing she was weakly, and behind in development; owing to poor sleep she had become very nervous, and on the slightest exertion became covered with perspiration.

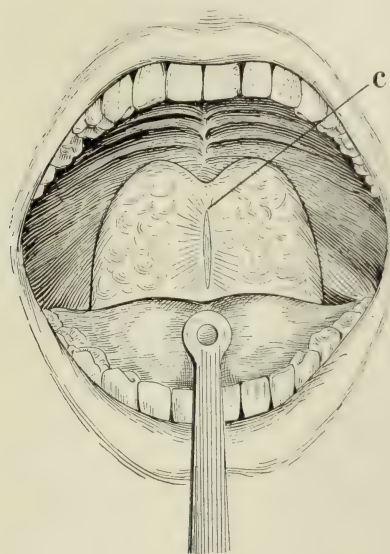
The examination of the throat showed a thick median cicatrix (Fig. 1) of the pharynx 3 to 4 cm. long, extending from the velum palati downward to a level with the base of the tongue or the upper border of the epiglottis. The whole posterior wall of the buccal pharynx was cicatricial and its lateral walls were drawn toward the median line in the form of an angle opened anteriorly, the posterior pillars being joined together. The edge of the soft palate to the right and to the left was included in the cicatrix of the pharynx; the uvula was normal, and between it and the cicatrix on the right side existed a virtual opening communicating with the nasal pharynx and allowing the passage of a

* Moritz Schmidt, "Die Krankheiten der oberen Luftwege," III. Aufl. p. 601.

probe 7 mm. in diameter, which could be easily moved from right to left in the nasal pharynx, which seemed normal in its dimensions. The opening, as stated, was but a virtual one, for the child could pass no air through it.

The operation was performed on April 3d, under local anesthesia with cocain applied to the surface and novocain injected. I made a median incision extend-

FIG. 1.



c, Cicatrix.

ing the whole length and through the thickness of the cicatrix. Then with two pointed discission knives, bent laterally right and left and passed through the virtual opening, I made two lateral flaps, my incisions passing behind what constituted formerly the region of the posterior pillars and the tonsils. I incised laterally and inferiorly as far as possible in order to reconstruct the pharynx completely, making in reality an artificial pharynx. The cicatricial tissue was exceedingly dense, and this part of the operation was rather difficult, and the child swallowed quite a quantity of blood, which was vomited before the end of the operation; but the result was very encouraging, for the respiration through

the nose in both directions was re-established immediately, and inspection of the throat showed it to be entirely normal in its dimensions, its outlines, and its general appearance. There was considerable cicatricial tissue on the flaps and the posterior pharyngeal wall, which I removed with Hartmann's forceps.

Once the operation was performed it was necessary to keep the parts asunder for a while to allow their epidermization. I had previously shown the child to Professor Delair, of the Dental School of Paris, to determine if it were possible to make a prosthetic piece to be applied to the teeth and palate and on which dilators could be attached reaching into the back of the throat to hold the flaps and the soft palate away from the posterior pharyngeal wall. Although he had never seen a similar case or made an appliance of that kind, he assured me immediately that it was possible, and that the child ought to tolerate the prosthesis as well as children and adults tolerate the artificial soft-rubber palates of which he is the inventor.

The apparatus he made for this case proved to be exceedingly ingenious. It was introduced into the mouth and throat of the patient immediately after the operation. This is the description Professor Delair gave me of the apparatus:

The pillars of the soft palate, as well as the soft palate itself, accomplish simultaneously or alternately, during phonation and deglutition, three well-defined movements. It was therefore necessary to combine and execute an apparatus working automatically and imitating perfectly the action of the soft palate and of its pillars, without attenuation or amplification of the action and effect of the lateral dilators. The movements referred to are—

(1) Maximum separation and approximation of the pillars.

(2) Raising and lowering of the soft palate.

(3) Antero-posterior and *vice versa* movement of the soft palate and of its pillars during deglutition.

The apparatus is composed of—

(1) A platinum plate adapted to the palatal arch and held in place by clamps surrounding the teeth.

(2) A small flat gold chariot movable on

two lateral slides. It moves antero-posteriorly and *vice versa* by means of a small rubber ring which unites it to the platinum plate. A stop and safety screw passes through it and lodges in a furrow of the platinum plate, thus preventing the disjunction of the parts in case the rubber should break. A hinge terminates the chariot.

(3) A small gold plate adapted to the central tube of the hinge and united to the

a little of the same salt internally. I saw her the evening of the day of the operation; I found her playing in bed with her doll, and I learned that, quite contrary to my expectation, she had had no pain the whole day, no nausea, no vomiting, and that the milk she took did not pass into her nose—paradoxical as all this may seem.

FIG. 2.



Inferior surface. (Concave.)

FIG. 3.



Superior surface. (Convex.)

chariot by another rubber ring acting as a spring and drawing the plate from below upward during the action of the soft palate, as well as the dilators attached to the plate.

(4) Two small horizontal bars made of gold, soldered on two twin hinges, bent so as to surround the uvula and surmounted by two aluminum dilators. The bars are about 20 mm. in length and are solidly held in place by two gold screws which serve as pivots. To their extremities are screwed vertically the two aluminum dilators, which are 4 mm. thick, 7 mm. wide, and 30 mm. long. The bars are united to the small gold movable plate, each by means of a rubber ring, which, on contracting, separates the one from the other.

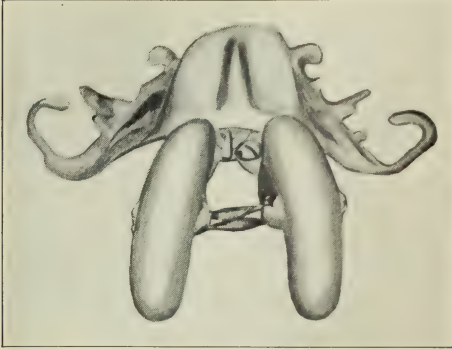
As soon as the apparatus was put in place the child was taken home. She gargled every hour with a solution of sodium bromid, and for a few days took

Three weeks later the throat seemed entirely healed, and I thought the apparatus might even then be finally removed, but as the child could eat, drink, sleep, and talk with it, and experienced no inconvenience whatever from its use, I thought it wiser to leave it in place a little longer. From the first, indeed, it had been removed and replaced by the child's mother after each meal, in order to clean and boil it. Now it is removed before the meal and replaced after.

This apparatus, of which the accompanying photos will give a sufficiently accurate idea, will find its application in all palato-pharyngeal symphyses of whatever origin, syphilitic, diphtheric, scarlatinal, lupous, etc. By its means the minimum of irritation to the healing tissues will be obtained, for it is light,

and movable in all directions, causing consequently no rubbing. The dilatation is not violent, but gentle; being constant, however, it is not painful, and it is quite sufficient to resist secondary cicatricial contraction, as the present case proves. Intermittent dilatation is painful, and is frequently followed by failure to bring about a cure.

FIG. 4.



Apparatus as viewed from behind forward.

This case demonstrates the possibility of tolerating permanent prosthesis in the pharynx, and may have important consequences for the surgery of the throat.

DESCRIPTION OF THE PHARYNGEAL EXPANDER.

The Pharyngeal Expander invented by Professor Delair has for its object to hinder the pillars of the soft palate coming together and their welding with the deep coating of the nasal pharynx. It is applied immediately following the operation known as Koenig's operation and may be designated as "express prosthetic dentistry."

The pillars of the soft palate as well as the soft palate itself accomplishing simultaneously or alternately during phonation and deglutition three distinct, well defined motions, Professor Delair has succeeded in designing and executing an apparatus working automatically which perfectly imitates the action of the soft palate and its pillars. At the same time it is so arranged that the working of the lateral dilators is neither diminished nor increased. The following are a few of its advantages—

(1) Maximum widening of the pillars one from the other or diminishing of the space which separates them to a minimum.

(2) Lifting and lowering of the soft palate.

(3) Antero-posterior motion—and *vice versa*—of the soft palate and its pillars at the moment of deglutition.

The apparatus fully responds to the desiderata of the surgeon, and that without giving any more inconvenience than the soft

FIG. 5.

Apparatus *in situ*. (To be seen with a magnifying glass.)

rubber valves which Professor Delair generally uses in the construction of artificial palates.

The apparatus comprises—

(1) A platina base-plate adapting itself to the palatal arch and held in position by gold clasps encircling the teeth.

(2) A miniature flat chariot in gold, moving on lateral slides. This chariot glides backward and forward. It is worked by a small rubber disk which connects it to the base-plate. A screw which serves both as check and safety screw runs along and lodges in a furrow hollowed out in the base-plate, thus preventing the disjunction of the pieces in case the traction rubber should break. A joint completes the chariot.

(3) A small gold plate fixed on the center tube of the joint is attached to the chariot by another rubber disk which forms a spring drawing in an upward direction, during the action of the palate, the expander fixed upon it.

(4) The two expanders are formed of two small horizontal gold rods soldered on two twin hinges and contouring the uvula. They are about 20 mm. long and are solidly held by two gold screws which serve as pivots. At their extremities, vertically screwed on, are two aluminum expanders. They are 4 mm. thick by 7 mm. wide and 30 mm. long. They are each attached to the movable traction plate by a disk of rubber, which as it shortens tends to increase their distance one from the other. In this manner, as soon as

they are placed behind the pillars in the furrow made by the lancet, the expanders draw the soft palate forward, separating the pillars and consequently enlarging the artificial pharynx which has been created by the surgeon.

Thus, as soon as they are placed behind the pillars and the palate in the artificial pharynx made by the surgeon, the dilators draw the soft palate forward, hold the walls of the pharynx separated, and resist the secondary cicatricial contraction.

A SIDE-LIGHT ON PROFESSIONAL INTEREST.

By **JAMES McMANUS, D.D.S., Hartford, Conn.**

(Read before the National Dental Association, in general session, at the annual meeting, Birmingham, Ala., March 30, 1909.)

IT is easy to find fault, and to criticize harshly; many have done so in the past, and now I am going to indulge in criticism to an extent that I hope will cause those who hear me, and those who may possibly read what I have to say, to reflect seriously and to make new resolutions to live and act in the open as dentists, doing the duty that many have for years deliberately shirked. And first I would throw a few side-lights on the past.

For many years I have known dentists who have held high rank in the state military service. To gain that rank they had to give up one or more evenings in the month to attending drills, frequently days to parading, and a week to the yearly encampment. They had to pay promptly the regular assessments, the cost of uniforms, and incidental extra expenses. With very few exceptions these soldier dentists had neither time to attend dental meetings nor disposition to contribute in any way toward the uplifting of the calling in the practice of which they earned the money that procured them food.

Another illustration, not quite so brilliant as the military but fascinating for

many dentists, is membership in the various social clubs, lodges, and uniformed orders. There are expenses connected with all these organizations, especially if one desires to hold an official position, and the money to meet those expenses is earned in the laboratory or at the dental chair. I believe in social clubs, lodges, and uniformed orders; I believe that men should band together for mutual benefit, and that such organizations are powerful for good, their influence being felt and feared by politicians and governments. I have still all the old-time boyish admiration for military men and officers, and the various society regalias are always attractive and interesting, possibly from the fact that I have known so little about them or what they represent. But with the passing years I have learned to respect and honor the men who show to the world that they are proud of the calling they follow, and who are earnestly anxious to perfect themselves by study and association with their fellow workmen along the line of work to which they have devoted their life. There might easily have been a successful social dental benevolent organization long ago in this country, if a thousand den-

tists had banded together and had contributed as liberally to its support as have the military and society dentists to the organizations they are connected with.

I have watched with keen interest since 1864, and have never ceased to wonder why more of the dentists of the country could not see the advantages and benefits that society membership would give them. Societies will always rank first for extended educational work, and since society membership and work has made it possible for the calling of dentistry to be classed with the professions, the fact that such a large number of practicing dentists are not society members tells an educated and observant public just where they may place these practitioners among the craftsmen of the world.

The first dental society was organized in 1839 by dentists who had high ideals and who were earnest workers, but the growth of dental societies has been very slow, and their influence, both socially and professionally, is yet quite limited. All that could reasonably be desired might have been gained if those who joined societies in years past had kept up at least a paying membership. We cannot blot out the record of men who have dropped membership; it is decidedly unpleasant to recall that you have helped—some of the time innocently—members and societies to elevate to office men who on completion of their term coolly retired on their laurels, forsaking the friends and societies that gave them honors.

During the sessions of the American Dental Association held in Chicago in 1865, I well remember the reception given by Dr. N. S. Davis at his home to the members, his earnest kindly welcome, and his serious talk and forecast of what the association might and should do along educational and professional lines. The lectures given by Dr. Brainerd and the eye specialist, Dr. DeLaskey Miller, at that time surgeons of Chicago, were intensely interesting, and for the first time doctors and dentists fraternally grasped hands before the public. Those

who attended the receptions given in the home of Prof. J. H. McQuillen of Philadelphia, from 1865 until his death, had the pleasure of meeting many of the medical and surgical celebrities of that city. Again, Dr. N. S. Davis of Chicago, then president of the Ninth International Medical Congress during the sessions held in Washington, D. C., in 1887, in his address of welcome to the members of the large Dental section, told of his continued and hopeful wishes for the success of dental educational associations. I remember the earnest work done by the committees, especially those on finance, in arranging for the success of the Dental section, the enthusiasm of those who were in attendance—numbering four hundred—and the generous contributions given by the members of the section toward defraying the large expenses of the congress.

The four hundred dentists who attended the medical congress in Washington, D. C., in 1887 were jubilant, and felt almost sure that dentistry had been recognized by medical men as a specialty of the healing art. Of that we are not so sure today. What we are sure of is this: The success of twenty-two dental schools awakened at that time in some of the medical teachers of the country an idea of what they might gain if dental departments were added to medical schools, and now lecture and other fees are paid by all the students of about fifty-six dental schools to over five hundred medical men whose names are printed in the announcements as professors and lecturers, and whose interest, with few exceptions, in dentistry is a financial rather than a professional one, and is limited to the hours engaged in preparing and delivering at most three lectures a week. I cannot recall of late years an occasion where medical men or college medical men have shown any special interest in dental affairs, and the fact that the large majority of the doctors of dental surgery who are heralded in college announcements as professors, lecturers, and demonstrators are not seen either at state or national meetings gives unmistakable evidence that they are not in

unison with and will not meet or work with society men for dental advancement.

There are fifty-six dental schools in the United States, and each of these schools ought to have an uplifting influence over the dentists in their immediate neighborhood. Each of these schools through their announcements and advertisements ask the dentists of the country to send them students, and there is no doubt that earnest students can gain a technical knowledge in any of them, but in order to succeed in business, in public affairs, and in social life, the young graduate must give evidence of a broad and liberal training which three years of student life under conscientious teachers would imply. If the graduates of past years had been fully impressed with the stubborn facts that they had, and always would have while they practiced dentistry, much to learn, and that the local, state, and national associations were advanced postgraduate schools open to them at all times, which it was their duty to support as active members and in which they would be certain to hear the best teaching and see chair and table clinics, and where they should have, and could have, all the advantages of fellowship with the best teachers and leading scientific men and operators of the country, my paper would have no excuse for existence. During the past twenty years the dental schools have graduated many thousands, and just why the state societies, and especially this National Dental Association, has not had a large increase in membership is a question which I propose to open for consideration.

The pioneer Baltimore College started out with four teachers in 1839, to blaze an educational pathway that has since broadened to a magnificent boulevard that gives ample space and opportunity for dental colleges to parade over 1500 professors, lecturers, and demonstrators, and to flaunt their banners claiming special fitness and facilities for teaching students dentistry as a specialty of medicine. The number of dentists and the status of dentistry in states where dental

colleges have prospered may be of interest.

The number of dentists in the states and cities and the number of societies given are taken from the last edition of Polk's Directory, and represent an under-estimate rather than an over-estimate of numbers. There are fifty-six colleges in the United States, whose professors and lecturers with the M.D., and M.D. D.D.S. degrees number over five hundred, and whose professors, lecturers, and demonstrators with the dental degree number over one thousand. In the fourteen states and Washington, D. C., as exhibited in the accompanying table (see following page) there are 22,841 dentists, 165 societies, 41 colleges, 419 men with the degrees of M.D. and M.D., D.D.S., and 872 men with the degree of D.D.S., but only 262 dentists* out of this large number are members of the National Dental Association.

As long ago as 1841, the dentists of the state of Alabama secured the passage of a dental law, and slowly the sister states followed her example. Connecticut's dental law was passed fifty-two years later. Each state seemed to be under the old influence of the doctrine of state rights when framing its law, and little thought or consideration was given to the possibility of any licensed practitioner ever finding it necessary to remove to another state. The hoped-for interstate recognition is yet afar off, and there is little chance for a unification of state laws until it is demanded by the united and persistent efforts of the dental societies of the country. Each state so far has felt the power of political rather than professional influence in the appointment of state examiners. Men who work for or accept appointments as state examiners know that they have arbitrary power, and as President Hetrick said in his annual address in Boston to the Examiners: "We are an advisory body rather than legislative or educational." They should take an interest

* In 1907 there were 262; in 1908, at the Boston meeting, 401.

Membership in N. D. A. in Relation to the States Having Large Societies and Colleges.

STATES.	Number of Dentists.	Societies.	Colleges.	M.D. and M.D., D.D.S.	D.D.S.	Members of N. D. A.	Examiners Members of N. D. A.
NEW YORK	3930	28	3	33	70	{ '07 37 '08 74 }	2 3
New York City	1324	..	..	..	..	..	..
Brooklyn	470	..	..	..	..	..	..
Buffalo	224	..	..	..	..	..	..
PENNSYLVANIA	3260	23	5	54	55	{ '07 33 '08 50 }	3 4
Philadelphia	1015	..	..	..	..	..	..
Pittsburg	238	..	..	..	..	..	..
ILLINOIS	3081	39	4	32	115	{ '07 21 '08 49 }	1 2
Chicago	1441	..	..	..	..	..	..
OHIO	2236	12	4	38	49	{ '07 21 '08 28 }	0 1
Cincinnati	247	..	..	..	..	..	..
Cleveland	306	..	..	..	..	..	..
Columbus	120	..	..	..	..	..	..
MASSACHUSETTS	1862	8	2	33	102	{ '07 12 '08 47 }	0 4
Boston	727	..	..	..	..	..	..
MISSOURI	1469	7	4	44	128	{ '07 19 '08 22 }	1 0
St. Louis	450	..	..	..	..	..	..
Kansas City	205	..	..	..	..	..	..
MICHIGAN	1353	7	2	31	25	'07 7	..
Detroit	312	..	..	..	..	..	..
INDIANA	1179	10	1	9	16	'07 6	..
Indianapolis	175	..	..	..	..	..	..
WISCONSIN	1169	9	2	13	51	'07 11	..
Milwaukee	276	..	..	..	..	..	..
KENTUCKY	748	2	1	13	11	{ '07 8 '08 11 }	..
Louisville	131	..	..	..	..	..	..
GEORGIA	650	2	2	9	18	{ '07 27 '08 39 }	0 1
Atlanta	110	..	..	..	..	..	..
TENNESSEE	605	5	3	19	24	{ '07 27 '08 33 }	1 1
Nashville	82	..	..	..	..	..	..
Memphis	59	..	..	..	..	..	..
MARYLAND	498	2	3	311	123	{ '07 8 '08 10 }	..
Baltimore	358	..	..	..	..	..	..
WASHINGTON, D. C.	329	2	3	44	34	{ '07 14 '08 31 }	2 0
VIRGINIA	472	9	2	13	51	{ '07 11 '08 7 }	0 3
Richmond	54	..	..	..	..	..	..
TOTALS	22,841	165	41	419	872	{ '07 262 '08 401 }	10 19

in the National Dental Association and become members thereof. They should know men from the different states, consult with them, act with them, show their interest in the calling which they officially represent. As the record now reads, of 230 state examiners in 1907 only 23 were members of the National Association.

While we might occasionally hope that more interest might be taken in dental societies by some of the medical teachers in dental colleges, we do know and we have a right to expect that there should be more active, earnest and helpful work done by a larger number of the doctors of dental surgery whose names are printed in the yearly college announcements as teachers and demonstrators of operative and mechanical dentistry. Their individual personal interest is on record, and should be supplemented by public professional interest in society work.

The pioneer dentists who started the educational movement and desire for professional recognition may not have foreseen the splitting up of what was then known as dentistry into pseudo-science specialties. The few who started out to ignore and render the old-time title "dentist" obsolete and to exploit the titles "stomatologist," "orist," "orthodontist," and "prosthodontist" have now many followers, and between the professional man who ought to know how to do many mechanical things, but does not, and the artizans and mechanical workmen who know how to do them, a barrier or dividing wall seems inevitable. Professional dentistry is all right in theory, but the conditions under which artificial teeth and mechanical appliances are now turned out from dental kitchens suggest commercial rather than professional relations. Dentistry means first the saving of teeth, and the mission of the colleges is to graduate men competent to do well the ordinary operative and mechanical work—that is, the class of operations and mechanical work that so many of the old-time dentists did so well, the kind of work and service that the great majority of the human family need all over the

world. Dental colleges are striving to do too much, they are striving to cover too large a field, and students are not held down as closely to the study of the principles of dentistry or given the thorough training they should have in performing the more common class of operations demanded of the dentist. Medical colleges graduate students not as specialists, but as men educated in the principles of medicine and surgery. They teach them how to study, but their diploma and license does give them a legal right without any experience to amputate limbs, remove tumors, operate for appendicitis, or treat serious and infectious diseases, if they have the courage to accept such cases. It is to the credit of the medical men that they buy books and are generally students, and that many of them take postgraduate courses. There are no other graduates from whom so much is expected as from the dental graduates, and no other class attempts to cover so much in the college course. The new porcelain and gold inlay work, crown and bridge work, which when actually required and properly done are so satisfactory, represent a class of operations, that dentists of long experience often find most difficult to make satisfactorily, and the correction of irregularities, while demanding the most careful study and judgment, is purely and wholly mechanical. Training in the fundamental principles and practice of dentistry and oral hygiene, the saving of teeth by operative treatment, and the making and adjustment of artificial teeth are what colleges are expected to teach during the entire course. These are the essentials for dental practice. If microscopy, histology, bacteriology, carving of block teeth, and orthodontia are essentials, then a four years' course is absolutely necessary, and under that ruling only students with means or those having backers may hope to enter dental colleges. It is fortunate that state laws do not require more than average ability from general practitioners, and state dental examiners are not likely to turn down applicants for license unless they are very deficient in theory and in average opera-

tive and mechanical skill. That out of 602 who applied for license in 1907 and 1908, 113 failed, gives opportunity to question whether the system of education was faulty, or whether the graduates were thoroughly incompetent to absorb instruction.

To the older dentist it has for years past been glaringly apparent how few among the many dentists are interested in either general or professional literature; and the one opportunity to get each year a valuable book, and their names for reference and indorsement as members on the roll of the National Dental Association, still fails to awaken in them a sense of duty or interest in their calling. A few years ago in conversation with a leading bookseller, I was surprised to learn that he sold few books of any kind, general or professional, to dentists, and that he did not consider dentists reading men. Again, later, in talking with a prominent dentist and teacher in one of the western cities, I learned that a bookseller told him the same thing, and then I recalled that at dental gatherings in years past I saw no dental or professional books on sale, which made good the statement of the booksellers. At the annual meeting of the Northeastern Dental Association held in Hartford last October, for the first time an agent of a publishing house appeared, and to the surprise of many took orders for a number of volumes. I have been told that after college examinations you can always find a goodly number of medical and dental books in second-hand stores, and that may in part account for so many failures in state examinations. As I recall the kindly advice often given to students by Professors McQuillen, Flagg, and that rare anatomist, surgeon, and philosopher, Garretson, to keep up their studies, to read and own books, to take advantage of the public libraries, to become members of a dental society, and to keep, if possible, in touch with medical men, I feel confident that, if similar advice has been persistently given in years past to graduates, the majority of them have completely ignored it, failing to appreciate its value and importance. It

has been a serious mistake to let so many graduates leave the colleges uncertain as to the relations which they might hope to enjoy in the future with the men who had been their teachers during the three most impressive years of their life, and whom they had learned to respect and love. The "good-by" and added cheery words, "I want to see you often in the future, surely at society meetings, especially at the National, which I hope to attend often," would be a pleasant memory and a constant incentive to their becoming working society members.

One of the peculiar traits which may be rightly called a dental inheritance, which was so noticeable in the early days and which held back dental progress so effectually, was the deliberate cultivation of the secretive disposition. Other craftsmen are more united and sociable, and where they number fifty, or even less, in cities and towns they secure a home place for meetings and social gatherings. The quickest and surest way for dentists to get consideration in a community is to have a society home like other organizations. A room in a central office building, secured at a moderate rent, has been the home of the Hartford Dental Society for the past eight years. Most of its furnishings had already done duty in the homes of some of the members. Books, bookcases, and chairs were bought; rugs, a clock, pictures, a table for magazines and one for clinic purposes, a writing-desk, and cushions were all contributed, and give the room a comfortable and homelike appearance. Each member has a key, and the room is accessible at all hours of the day or night, Sundays included. We have our regular meetings there, and a pleasant feature is the Monday club night and registration of members and guests. It is an inexpensive club-room where all are on an equality, and sociability so far has reigned supreme. We are proud of our dental home, for we all realize fully how much we have been benefited in our calling, as well as how much we have enjoyed the comforts and pleasure of social companionship.

The large number of dentists that have

been called together in New York, Philadelphia, Washington, Chicago, Minneapolis, St. Louis, Boston, and frequently in Asbury Park, under the auspices of the American and National Dental Associations and other gatherings, under the management of state and local associations, particularly in New Jersey, Chicago, and St. Paul, tell what efficient, earnest men have been able to do, and also what it would have been possible for them to do if they had put a little of their surplus energy into organizing a dental benevolent association. Many claim that American dentists, dentistry, and dental organizations lead the world. A glance at the record of what has been done in England will cause them to change their opinion. The British Dental Association for several years past has published a successful and profitable professional journal. It has maintained permanent home quarters for many years in London, open every day, except Sundays, for the use of members and friends, and in 1883 a Dental Benevolent Association was organized, in which only registered dentists are eligible to membership. In 1907 there were 4472 dentists registered, and 1200 of them were members of the association. The association has received some gifts, but owing to the depreciation of some of its bonds within the past few years, the amount invested is now only about \$15,000. The annual dues are \$5 a year, and the income about \$3000. The disbursement to beneficiaries in 1907 was \$2600. Only the members of the committee are supposed to know who receive benefits. When one recalls the brilliant and at one time very successful dentists who were cared for by the contributions of a few friends during the past twenty years in and about New York alone, and realizes the possibility that many in years to come may sadly need assistance, it is strange indeed that a movement for such an organization has been so long delayed.

The actors in this country have set a noble example, for they have had such an organization for years past, and in the large cities have given yearly benefit performances to increase its funds, and the

leading actresses and actors vie with each other in their efforts to make it a grand artistic and financial success. If only one-tenth of the dentists in this country would unite and contribute once a year the fee received for one gold operation, a fund would be secured large enough to help to cheer and sustain many an unfortunate man and family in their time of trial, sorrow, and want. That two such associations should be firmly established in this country seems a duty. We know of the success of the one in England with a membership of 1200 drawn from a registry list of less than 5000. The New England and Middle states, with a registry list of 12,300, and the Western and Southern states, with a registry list of over 20,000, ought to have at least 1000 men in each section who would be glad to become members of such an organization. Such organizations would bring about the assurance that wherever there were fifty practicing dentists they had a dental home and were united in sentiment and purpose, and the public would quickly recognize that they had citizens, as well as dentists, whose wishes were to be considered and respected. In Boston the Academy of Dental Science and other local societies hold their monthly meetings in a hotel. In New York the Odontological, the Stomatological, and the First District societies hold their meetings in the Academy of Medicine, and in Chicago the largest local society in the world holds its meetings in rooms in the Public Library building. Surely in each of these cities the dentists are numerous enough, if they were united, to have suitable rooms for their exclusive use, and suggestions, petitions, or protests emanating from such home quarters would command instant attention and consideration, from not only citizens and civic authorities, but also from representatives and senators in Washington.

Today we look backward and briefly recall a few incidents in the history of the American Dental Association organized just fifty years ago. During all these years the ethical standard of professional gentlemen has never been lowered. Until this year, to become a mem-

ber a dentist must have proper credentials from the officers of his state society, and the limit was one delegate to every five active members of the society represented. One very important fact stands out that should not be forgotten and should be carefully considered in passing judgment: Never since the organization of the American or National Dental Association has any state succeeded in any one year in having a full delegation report for membership, and but very few of those that did attend chose to become permanent members. During all these years, with the membership very far below the constitutional limit, the treasurer has never been overburdened with anxiety as to how he should invest surplus funds. Yet, limited financially as the association always has been, it has never yet failed to cheerfully help along all the scientific investigations, experiments, and practical work that the proper committees reported as being worthy of aid. Every judicious movement made for the uplifting of dentistry has been cheerfully and financially assisted, and when San Francisco was so fearfully afflicted, the association promptly and liberally sent assistance, while the members of the association became active agents in raising funds, dental materials, and other necessary articles, which were forwarded for prompt distribution among the unfortunates. Members from this association journeyed to London in 1881 to unite with the English and Continental dentists to make the Dental section in the Seventh International Medical Congress a great success. In 1887, the Ninth International Medical Congress held its sessions in Washington, D. C., and the Dental section there was under the auspices and management of members of this association. That Dental section attracted 400 dentists, including the foreign delegates, and was thought then to be a great success. The expenses of that section were large, but they were met by the liberal contributions of the members, who also contributed more than generously to the expenses of the general congress.

The Columbian Dental Congress was

held in Chicago in 1893, under the auspices and management of members of the American and Southern Dental Associations, and all who were there will recall how prompt and full were the published daily reports of the papers and discussions, and what a large, varied, and beautiful display of dental instruments, appliances, etc., was exhibited by individuals and manufacturers, showing what had been done in other countries as well as in our own for the betterment of dental service. The success of the Columbian Congress raised dentistry to a higher level, and led dentists to take a broader view of men, of life, and of personal duty. In 1904, under the same auspices and management, the St. Louis Dental Congress was held, easily ranking first among dental gatherings. From all parts of the world educators, scientists, mechanics, and practicing dentists were brought together; many of these were specially delegated and wore the orders conferred on them for recognized merit, and from our own country the largest number of ethical dentists ever seen under one roof was assembled.

The literary, educational, scientific, and historical papers, the section work and the clinics, the interesting historical exhibits, and the display exhibited by the manufacturers of dental goods, gave to the congress an educational character and value far exceeding the most sanguine hopes of the promoters and managers. Together with the closing incidents and the brilliant scene of the banquet at the Jefferson, we recall the manly, intellectual-looking men, the brilliant women, the inspiring music, the eloquent introductions by our own B. Holly Smith, the characteristic emotional responses by the foreigners, the singing of the national airs of the different countries represented, the eloquent words of welcome from our own representative men to the visitors, now most valued friends. All this will remain with those who were present as pleasant memories while life lasts. The same auspices and management were largely in evidence at the successful Jamestown dental gathering, and have also been recognized and

appreciated at the dental gatherings in Europe for several years past. "Lest we forget," I recall these incidents and events, for they illumine the past, they tell unmistakably what has been done for the uplifting and betterment of the calling of dentistry throughout the world, by and radiating from the American, Southern, and National Dental Associations. Not a few of the 40,000 dentists of the country are saying what these associations ought to have done. The working members of these associations know well what might have been done with a larger membership. The younger men have a future, and it is to be hoped that they will make good, always keeping in mind that all that has been done, all the true progress that has been made in every department of dental science, literature, and art, has been given out to the world through the publications, discussions, and clinics given before or under the auspices and management of members of these associations during the past fifty years.

I have been proud of the old American, the Southern, and the National—for they are one, and I hope that our National body will rank in the future, as it has in the past, as the first and best organization in the world. If reorganizing with a new constitution and by-laws

will increase its efficiency, usefulness, and influence, go ahead and reorganize! A new constitution and by-laws, if you can induce all the new and old members to read it through carefully twice, ought to do them good and arouse them to greater activity in getting and striving to hold the old and the new members through life.

Members—permanent, paying members, and more of them—is what has been wanted for years past to make this association influential and powerful. The medical men of the country do not all attend their National Association meetings, but a very large number do keep in touch with the secretary and treasurer, and their yearly subscriptions gain for the *Journal* of the association a large advertising patronage, powerful influence, and a full treasury. And this association might easily have been a good second to the medical, if a broader and more active personal interest had been taken in society work by authors of dental works, contributors to dental journals, state examiners, and the faculties, lecturers, and demonstrators of the numerous dental colleges of the country.

Medical men take a just pride in their calling, setting an example that many members of our profession might follow to their advantage.

RIGGS' DISEASE.

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(Read before the District of Columbia Dental Society at its January 1909 meeting.)

IN selecting Riggs' disease as the subject of my paper, I realize to the fullest extent that I am treading on very dangerous ground, for it is my intention to give a classification of the different forms of Riggs' disease which I

am not sure will meet with entire approval. So much has been written on Riggs' disease that it behooves us to know just what its cause is, and what its treatment should be. I therefore wish to state my ideas in regard to this matter, believing

that they will assist you, at least to some extent, in gaining a more correct view of the subject.

As far back as 1746 this disease was described, but no name was suggested at that time by which to designate it. From that date until the present day it has received by the dental surgeon the greatest attention perhaps of any condition of the oral cavity known to him, and at the same time has been his greatest annoyance. We are still in the dark in regard to the cause of this malady—and why? Because *four distinct diseases* which affect the gums, pericementum, and alveolus have been called “pyorrhea alveolaris.” I ask you to listen for just one moment to the ideas expressed by eminent authorities in regard to Riggs’ disease, or pyorrhea alveolaris.

Magitot, in 1867, claimed that this disease begins at the neck of the tooth by a progressive inflammatory condition which proceeds slowly to the apex of the root, destroying the alveolus and pericementum, thereby causing loss of the tooth. He claimed that the disease was of systemic origin and that the tartar found on the roots of the teeth should be considered as accidental and not as a causative agent; he advised, however, the removal of the tartar as an indispensable preliminary to the treatment.

Serran, in 1880, took exception to Magitot’s views, stating that the primary cause is a local congestion of the gums followed by a pathological condition.

Dr. John W. Riggs, in his paper entitled “Suppurative Inflammation of the Gums and Absorption of the Gums and Alveolar Processes,” which was read before the American Academy of Dental Surgery in October 1875, emphatically denied that the disease is an affection of the bone or gums, or that it is hereditary or constitutional, but on the contrary, that it is the roughened teeth themselves, in consequence of the accretions, derived from whatever source, which are the exciting cause of the inflammation; that it is of purely local origin, the result of concretions near and under the free margins of the gums, the removal of which,

even in the third stage, is followed by a cure.

In 1877, Rehwinkel entered his protests against the theory of the local origin of the disease and endeavored to prove that it not only may, but does, exist independently of foreign deposits; that it must depend on other than merely local causes, and that it is an hereditary and constitutional disease.

Ingersoll, in his paper entitled “Sanguinary Calculus,” states that the inflammation and ulceration begin at the apex of the root or near it; that the liquor sanguinis escapes from the bloodvessels into the surrounding tissues and becomes disorganized, the calcium salts crystallizing on the surface of the roots and forming the deposits which he designated as sanguinary calculus. In other words, he claimed that pyorrhea alveolaris was a local disease, beginning at or near the apex of the roots.

Dr. Witzel regarded Riggs’ disease as a primary, local alveolitis, having no constitutional relations whatever; a molecular necrosis of the alveoli or caries of the dental sockets, produced by septic irritation of the medulla of the bones.

Dr. G. V. Black considers pyorrhea alveolaris as a local disturbance. He uses the terms calcic inflammation and phagedenic pericementitis to indicate its character, and says that the disease is one of the periodental membrane rather than of the alveolus, though the destruction of these two structures is so nearly synchronous that it is difficult to say which has gone first.

Dr. J. W. Reese regards Riggs’ disease as a systemic condition, and suggests that it should be called phagedena pericementi. He also states that there may be absorption of the pericementum without any signs of deposits on the roots.

Now, if we stop to analyze the investigations of these men, we may easily see that they have defined four distinct diseases of the gums, pericementum, and alveolus. I have been studying these disease conditions of the oral cavity for several years, and have adopted the following classification, which to my mind

describes the different forms of Riggs' disease.

Classification. (1) Pyorrhea alveolaris; (2) Phagedenic pericementitis; (3) Arthritic pericementitis, and (4) Atrophic alveolitis. I shall now consider briefly each one of these forms of Riggs' disease, try to point out their characteristic symptoms, and describe my method of treatment.

PYORRHEA ALVEOLARIS.

In the "American Text-book of Operative Dentistry" we find the following definition: "Pyorrhea alveolaris is a generic term which, strictly defined, means a flowing of pus from an alveolus."

To my mind pyorrhea alveolaris is a purely local disease, and anything that acts as a constant irritant to the gums may bring it on. It is always preceded by gingivitis, which is caused in the great majority of cases by the accumulation of starchy food around the necks of the teeth or by deposits of calculus. In fact it is a filth disease, and is never found in mouths that have had proper attention. This no doubt appears to be a very broad assertion, but nevertheless I believe it to be a true one.

The characteristic symptoms are: Looseness of the tooth or teeth; peculiar odor of the breath; the gum may be either highly inflamed or puffy and of a pale pinkish color; pressure on the gums produces a flow of yellowish white pus from around the necks of the teeth affected. Together with these symptoms we find deranged digestion and faulty metabolism, which in turn lowers the vitality of the diseased tissues, thereby causing a more rapid spread of the condition. We also find in severe cases the nervous system very much deranged.

Treatment. Not very long ago I read in one of our dental journals a paper on pyorrhea alveolaris, the author of which recommended the use of thirty different medicines in the treatment of this disease. The use of so many medicines, and with such good effect, proves conclusively to my mind that the principal thing to do in treating pyorrhea alve-

olaris is to give nature a chance. The following is my method of treatment: First, thoroughly cleanse the oral cavity—and by this I mean the mucous membranes of the hard and soft palate, cheeks, tongue, etc.—remove all deposits, ligate loose teeth, and if more than half of the roots of the affected teeth are denuded of the pericementum, they should be retained by a permanent splint. Correct malocclusion, massage the gums, and wipe out any pocket with iodo-glycerol, as suggested by Dr. Talbot. I know of no combination of medicaments that acts so efficaciously. Instruct the patient how to cleanse the mouth and massage the gums. Have him drink two to three quarts of water a day, and take exercise in the open air, preferably walking. Recommend a diet of cereals, vegetables, laxative fruits, and under no circumstance allow the use of white or hot breads. All foods should be thoroughly masticated. Use normal salt solution as a mouth-wash and let the dentist apply all medicinal treatment. Dr. Rudolph Beck of Chicago recommends a bismuth paste for the treatment of pyorrhea alveolaris and says: "The majority of cases which I have treated up to date by the bismuth paste have either been cured or have shown signs of improvement, and in but a few cases has a recurrence taken place. I ascribe the failures to faulty technique—mainly, that the paste did not reach every part of the infected area. When this fault was corrected, satisfactory results were obtained. The following is his formula:

	Per cent.
Bismuth subnitrate,	30
White wax (melting-point),	5
Paraffin,	5
Vaselin,	60
Mix while boiling.	

The paste is injected into the pockets with a metal syringe having a fine tapering silver point. This he says may be done before the deposits are removed. At the next sitting remove the deposits and re-inject the paste. I have not tried this method, but intend to do so at the earliest possible moment.

PHAGEDENIC PERICEMENTITIS.

Definition: A gangrenous ulceration of the pericementum.

The etiology of this form of Riggs' disease is not quite clear. It may be closely associated with other forms, which may make the diagnosis quite difficult. I believe that the cause of phagedenic pericementitis is of local origin, microbic in character, and that gingivitis always precedes it. Generally only a few teeth are affected by it at a time, and it runs a rapid course, attacking the tissues at the margin of the gum, most frequently on the labial or buccal side. The destruction of gum, alveolus, and pericementum is very rapid, showing that the nature of the micro-organisms is very virulent. The gum is ragged, highly inflamed, and the exposed root of the tooth is very sensitive, and may be covered with deposits of a granular character. This condition is most frequently found in mouths that are highly acid.

The prognosis is generally discouraging. The root or roots should be scaled, the pockets washed out and cauterized with trichloroacetic acid, and the tooth given surgical rest. The mouth should be kept in an alkaline condition and attention be given to the digestion. The intestinal canal is usually found in very bad condition.

ARTHRITIC PERICEMENTITIS.

Arthritic pericementitis is a disease of systemic origin found only in patients suffering from rheumatism, gout, or any condition arising from the effects of uric acid, and may affect the entire dentures of both upper and lower jaws.

It progresses slowly unless associated with other forms of Riggs' disease, and it may be years before the teeth are lost. We scarcely ever find it before the twenty-fifth year, and in most cases it does not begin until after the thirty-fifth year.

This disorder may begin at the gum margin or at some point on the root between the gum margin and the apex of the root. Its origin, however, is generally

at the gum margin, commencing with a low grade of inflammation, which never assumes an angry form unless complicated by other forms of Riggs' disease. The tartar found is composed largely of sodium and calcium urates, is deposited from the blood, and is very difficult to remove. Sometimes a creamy white pus may be expressed from beneath the gum margins, which indicates the invasion of micro-organisms.

Arthritic pericementitis progresses so quietly that it may be several years before the patient realizes his condition. As a rule it attacks robust, apparently healthy individuals, whose teeth are free from caries, and whose visits to the dentist, therefore, are few and far between. This disease, like rheumatism, cannot be cured, and unless treatment is kept up continually it will reappear.

Treatment. Remove all deposits, polish the necks and roots of the teeth exposed, and treat the gums with iodo-glycerol. All medical treatments of the gums, as stated before, should be applied by the dentist. The patient should be kept well in hand, paying at least one or two visits a week until the condition is such that we can dismiss him for a month at a time. Great attention should be given to the diet, and such food should be recommended as will keep the alimentary canal clean. The great trouble with this condition and with all rheumatic or gouty conditions lies in the digestion. The trouble begins in the mouth sometimes, and passes down to the stomach. The poisonous substances swallowed that are taken up by the blood and carried out into the system have a tendency to weaken the system generally. The use of alkaline mouth-washes is to be recommended, and also some alkaline water. Lithia tablets taken three times a day—a five-grain tablet in a glass of water—I have found very effective. Exercise in the open air is also very essential.

ATROPHIC ALVEOLITIS.

Atrophic alveolitis I would say is a disease of the alveoli, which is sometimes

classed as pyorrhea alveolaris, but is nothing more or less than an atrophy of the alveolar process. There is no invasion of micro-organisms, because we do not find any pus present.

We find this form of Riggs' disease only in those patients whose teeth have been regulated, especially when the arch has been expanded, and in mouths where the roots of the anterior teeth are prominent and covered by a thin alveolar process. Sometimes it is observed on the buccal roots of molars, and in some cases I have seen the palatal roots of molars affected.

On account of the alveolar process being so thin and dense—as it always is in such cases—there is little room for the expansion of the bloodvessels, so with only a slight irritation at the gum margins we have a degeneration of the process set up which is nothing more or less than embolic atrophy. Injudicious use of the tooth-brush, badly selected tooth-powders, acid conditions of the oral cavity, and pre-senility are the causes of atrophic alveolitis. The gums recede in a V-shaped form, and sometimes have a corded appearance.

Treatment. The treatment of atrophic alveolitis is largely palliative, at least such has been my experience. Keep the exposed roots well polished and the mouth in an alkaline condition. Use only such powders as are soluble, and caution the patient in regard to the too vigorous use of the tooth-brush. Unless infection sets in, the recession of the gums and process only proceeds to where there is sufficient thickness of the bone for nature to protect itself.

If any of my observations will assist in bringing about a classification of Riggs' disease I shall feel amply repaid. Pyorrhea alveolaris means a flowing of pus from the alveolus, and while it only describes a symptom, it is characteristic of the disease which we always consider as pyorrhea. These other forms I have mentioned are entirely different. You may have a pyorrhic condition with phagedenic pericementitis or you may have it combined with arthritic pericementitis; but I think what we should do,

and what all writers should do, is to designate in some manner the character of the disease that we wish to consider, and not write about pyorrhea alveolaris when any one of the other forms of this disease is meant.

Discussion.

Dr. THOMPSON. The subject before us is one that if I wanted to do anything like justice to it, if justice could be at all done to this subject, would require that such a paper be read at one meeting and discussed at the next. The classification that the essayist has brought before us is very clear and concise as far as we understand it. The subject as a whole is too large to be discussed in one evening. In the first place, the word pyorrhea (pus in the alveolus) explains nothing except a manifestation. What we wish to get at in order to treat this disease properly is its cause and its development. Possibly Peirce of Philadelphia has most clearly presented this subject, and while he agrees with these gentlemen to a certain extent, he goes farther, and calls it gouty pericementitis, which covers it all, because it is purely a disease of the pericemental membrane.

The first stage is the stage of stimulation, due to a thousand different causes, deposits, foreign matter, and faulty metabolism. We must look at it from its primary standpoint, from its first irritation, its local cause. It is found as a rule, we all agree, in teeth which have not been taken care of. The pericemental membrane being affected brings about what is called by Peirce "the stimulating stage." What is the effect of stimulation? An excess of nourishment to the part. What is the result of excess nourishment to the part? Induration. The second stage is the same causing a deposit of calcium urate. This may exist for years without any indication whatever, until an irritation of the alveolus and integumentary covering is started, then the inflammation extends to degeneration of the cellular elements, and we have atrophy and resorption of the alveolus. When atrophy of the alveolus takes place we have the third cause, the

pockets, and these once formed, food enters and remains there, ferments, and creates fermentation. Thus we have the whole history of the disease in a nutshell, but this is only one phase of many. Take the calcic pericementitis, as mentioned by the essayist. The treatment consists in removing the deposit. Calcic pericementitis may exist without any manifestation except sensitiveness to percussion and to heat and cold. Now, you would say, how can a tooth be sensitive to heat or cold without the pulp being affected. The pulp is affected. The blood that has been heaped up in the tooth involves the nerve by pressure, and we have hyperesthesia due to hyperemia.

In Minneapolis, I went to a place called St. James, where a Dr. Ulner had been treating a patient who had been suffering with neuralgia for two years. The man was about forty years of age. I made an examination of his teeth, and the only one giving any response was an anterior molar. Upon passing a broach up, I found a pocket, which did not manifest itself in the gum, on the buccal root of the third molar. Going farther, I found a necrotic condition; I took a drill, and going well up into the alveolus cut away dead bony tissue; used sulfuric acid and a twenty-five per cent. solution of hydronaphthol in alcohol.

It is impossible to do justice to even one phase of this subject in a brief discussion. Pyorrhea is one of those problems that keep a dentist at a standstill, and unless we find something that will dissolve the deposit upon the teeth, and treat our patients systemically to overcome the setting up of faulty acid metabolism, giving lithia waters, etc., we can give no hope of success at all.

Dr. Head is using hydrogen ammonium fluorid, and I believe he is on the right track.

Dr. A. B. CRANE. A gentleman came to my office the other day and wanted to talk to me about a cure for pyorrhea. I did not have time to talk to him; but in my experience I never have seen a cure for pyorrhea, and I must say that I am not very hopeful that I ever shall. Some years ago, I attempted to under-

take special research on this subject, and made some pretensions of being able to treat the disease and cure it, but I am very sorry to say that most of the cases which I cured, or thought I had cured, came back in a worse condition than they had been originally.

I am very glad that Dr. Taylor has divided this disease into four classes, because there is no doubt that at times the terms pyorrhea alveolaris, phagedenic pericementitis, arthritic pericementitis, and atrophic alveolitis are used loosely and without really designating the trouble which the dentist is trying to combat. The sooner we obtain a real classification of the different phases of this trouble and its underlying causes, the sooner we shall reach that point where we can hope to give a patient something in the way of permanent relief. The disease which the essayist has classified as phagedenic pericementitis appears to me to be of the nature of a catarrhal disease, and the more I see of it the more firmly I am convinced that it is catarrhal, and it should be treated like catarrh.

With regard to deposits of tartar on the roots of teeth being present prior to the death of the pericemental membrane, I have extracted thousands of teeth, and I have extracted few that I have not examined, and I have yet to discover a case of calculus under a live pericementum; my experience therefore leads me to believe that this is a theory which cannot be substantiated by actual clinical practice.

Dr. FENTON BRADFORD. Dr. Thompson in his discussion mentioned the point of dissolving urates. He said that it was the only way in which we could hope to treat pyorrhea successfully. I might relate a little personal experience for the information of Dr. Thompson. Some five or six years ago, I was myself troubled with those deposits on the teeth and also in the kidneys. I got rid of them, not by the knife, as some have, who afterward died, but by treatment with German mineral water—Wildungen Helenen Quelle. I had a case of renal calculi, a very bad case, and the pains

were very severe, lasting five or six hours. I met a German physician, and he recommended a change in my diet, avoiding red meats and acids of any kind and fruits that would produce acids, and he told me to take this mineral water. I took the water, and I had no more trouble with my kidneys, and noticed a diminution in the amount of calculus on my teeth. That is one experience that might aid Dr. Thompson. I heartily approve Dr. Taylor's method of treatment. Of course we all know that the calculus must be removed. I think one of the most valuable adjuncts in the treatment of Riggs' disease is fresh air, exercise, and massage.

Dr. S. W. BOWLES. I have not read very much of the literature on the subject, but Dr. Taylor seems to have presented to us a very clear outline of the subject. He has given us a sound and logical *résumé* of the treatment. One point which he did not mention in the treatment is the matter of the vaccine treatment. Those of us who went to the Boston meeting this summer had the pleasure of hearing a very fine paper on this subject by Dr. Timothy Leary, one of the medical men of the Harvard school. I was very much interested to see that after he had outlined his treatment and given the result of that treatment in the hospital, he came back to our dental standpoint, *i.e.* the treatment consisted in the thorough removal of the deposits, the cleaning of the teeth, and the keeping of the mouth in a clean and aseptic condition. Then the vaccine is applied. Dr. Leary had no case to record which was completely cured. His paper was what might be called a progressive paper, showing what had been done, but the essayist was not ready to give an opinion on the vaccine. We all hope that it will be what we are looking for, a cure for this malady; but I was interested to see that the physicians have not accomplished any more than we dentists have.

I cannot add anything to Dr. Taylor's paper, excepting to say a few words about splinting. The splinting of the

teeth in pyorrhea when the root is exposed to half its extent seems to me one of the most important phases in the treatment. In all the cases which I have splinted the happiest results have been obtained. The splinting depends altogether on the condition of the teeth and the ingenuity of the operator. They can be splinted with bridge work, inlays, or by sinking bars into the crowns of the teeth, or by a combination of all these different methods. It is not necessary to decrown the teeth or to always make a crown, for a bar well embedded in the teeth and covered with amalgam or gold—usually amalgam, because the teeth will not stand gold—will keep the teeth in place. The teeth being held rigidly will tend to reduce the inflammation to a great extent. In splinting I would advise against ligatures and against the many forms of bands or caps at our disposal. Splints of that kind are not clean, and in time will become loosened. If a splint is to be effective, it must be absolutely rigid, and must be made so that it will not become removed in any way. Teeth that are splinted can be more easily and perfectly cleansed.

Dr. TAYLOR (closing the discussion). In closing I wish to thank those members who participated in the discussion of my paper. I will admit that it opens up a very large field for discussion. The main point that I wished to bring out is the classification of the different forms of Riggs' disease.

Pyorrhea alveolaris can be and is cured in thousands of cases, just as pneumonia is cured; but the patients, after they get along nicely for awhile, stop coming to the dentist for treatment. They come once in three months; then once in six months, and finally they wait for a year or two, without even taking the trouble of cleaning their teeth thoroughly—although it is almost impossible for a patient to thoroughly cleanse teeth that have once been affected with pyorrhea alveolaris. I think that when people realize the importance of their teeth they will go to the dentist, who has the ability to cleanse them in a thorough manner,

and have them attended to, just as thousands of people go to have their nails manicured, their hair dressed, or their scalp treated.

In regard to arthritic pericementitis, I wish to impress upon your minds that it is always associated with a rheumatic condition, and the patient must be under constant attention. The disease will not progress to any great extent inside of

six months, but in a year it will almost relapse into its original state.

Splinting is certainly a most effective method of keeping the teeth in place; but when they are splinted, the lateral motion of the jaw should be taken into consideration, and if the occlusion is not correct, the cusps of the teeth should be ground to relieve them of any undue strain.

SOME CONSIDERATIONS RESPECTING DENTAL JOURNALISM.

By C. S. VAN HORN, D.D.S., Bloomsburg, Pa.

(Read before the Luzerne and Lackawanna Dental Society at its annual meeting, Scranton, Pa., February 16, 1909.)

DENTAL journalism seems to be the target for a variety of arrows. It is not the purpose of this paper to cover the entire field of dental journalism, but rather to stimulate earnest thought along certain definite lines with the hope of inducing individual and concerted action which will ultimately result in establishing universally a higher ideal respecting the duties of the dentist to his profession, to his colleagues, and to humanity.

Long before I entered the profession, and during the fifteen years of my active association therewith, there have been, from time to time, cries both pathetic and irritating for a dental journal owned, controlled, and edited by the profession; but so far as I am able to discern we are as distant from this acquirement as ever before. Why is this so? Why is the dental profession in the United States without a representative journal?

I am informed that in the United States there are some 35,000 dentists in active practice, and that each year this number is augmented by graduates from the various dental colleges. Three dollars per annum cannot be considered an

exorbitant subscription price for a representative journal, and the man who asserts that there is one ethical dentist in active practice who cannot afford the subscription is advancing a tenet which he cannot prove. At \$3.00 per volume, 35,000 volumes would be \$105,000, and to my mind \$105,000 would be an adequate amount to launch a representative educational medium devoted to increasing the intellectual status of the subscribers and enhancing the dignity of the science of dentistry.

I am confident that all will agree that the profession is sufficiently large in numbers and amply able financially to maintain an exceptionally high-class journal; that there are in the profession a number of men capable of editing such a publication, and that the editors would not have to go news-begging to fill to overflowing the text pages with practical, scientific, and elevating knowledge.

It being conceded that we have the knowledge and that we have the intelligence, there remains but a single adjunct necessary to accomplish the launching of a professional journal; this adjunct, the most essential of all, is the *desire*. Do we as a profession desire a

publication owned, controlled, and edited by dentists for dentists? Evidently we do not! And the reason why we do not is in my judgment traceable to the condition that obtains after graduation.

Somewhere between the ages of say eighteen to twenty-five we matriculate at a reputable dental college and thence proceed to pass through the various arduous ordeals incident to the acquirement of the degree D.D.S. At the end of three years of diligent application we are given the documents necessary to procure admission to the state board examinations, and finally issue forth with all the credentials required by law, and proclaim to suffering humanity that we are eminently fitted to supply their needs.

We have been graduated, and being possessed of the credentials and the concomitant skill and knowledge—really a rather substantial veneer—we proceed to strive for our heart's desire. But what is this desire? and does its culmination result in advancing to a remarkable degree the educational and ethical status of the profession? Evidently our desire does not symbolize education, else we would have a representative publication, and an increased interest in professional advancement would naturally ensue; for it cannot be denied that education is largely a result of desire, and as soon as we realize our ignorance and are possessed of a desire to improve our mental condition we at once symbolize advancement. That this desire is in a lethargic state is to my mind due largely to the fact that we do not recognize our present current literature and in consequence are not fully cognizant of our ignorance.

True, our present current literature is confined to "trade" journals; but, gentlemen, these journals are as a rule not only ably edited, but what is of transcendent importance, they are very largely a compilation of the united efforts of the foremost minds in the profession. Who can say, after carefully perusing the writings of Bonwill, Varney, Taft, Webb, Miller, Black, Talbot, Angle, Truman, Head, Jackson, and many many others, that he has not been benefited? Who is there that does not feel a beneficial influence when

studying, digesting, and assimilating the thoughts of the master minds, past and present, of our profession?

I say frankly that it is not the reading of the text pages of "trade" dental journals that dwarfs the intellect and tends to inhibit the launching of a professional journal. The apathy is the result of disregarding our current dental literature! Show me a dentist who subscribes to and diligently reads and studies the text pages of our foremost "trade" journals, and I will show you a man ready and willing to take off his coat and roll up his sleeves in the interest of professional journalism. He will lend financial and intellectual aid, though it necessitates the burning of midnight oil to do it. I therefore say that any attempt, honest or otherwise, to divert the minds of the profession from perusing the text pages of honestly edited "trade" dental journals, with a view to increasing interest in professional journalism, is but to weaken and thwart the good cause for which he who, though perhaps innocently, shoots the poisoned arrow is striving.

I am averse to petty cavil and calumny respecting the editing of "trade" dental journals, for I cannot bring myself to believe that men occupying high positions in the profession would pusillanimously deviate from the path of rectitude by allowing the text pages of the journals which they edit to become subservient in a direct commercial way to the manufacturers who publish them. Nor do I believe that the publishers of representative "trade" journals would so far forget fundamental business principles and common decency as to intimate to the editors that manuscripts not favoring their products must be eschewed.

Dental journals must subserve the interests of the men publishing them, and that they are subservient to their interests cannot be gainsaid; but, as I see it, the value to the manufacturer lies in the fact that the journals serve as an advertising medium, and the advertising is confined exclusively to the pages devoted to that purpose.

On the quality of the substance contained in the text pages depends the cir-

ulation of the publication. Journals publishing a great many high-class original articles and the proceedings of the more noteworthy societies would naturally command a larger circulation than would those journals which are made up mostly of "second-hand" copy, and as the value of advertising space generally is governed by the circulation, it seems to me but logical to assume that the ambition of the discriminating manufacturing publisher would naturally be centered upon producing a high-class publication free from aspersions, erasures, or additions. That we have publications worthy the name of ethical "trade" journals is plainly evident, and that the text pages are manifestly worthy the careful perusal of every ethical practitioner cannot be denied.

I have in my library a number of volumes of a certain "trade" publication—these volumes have been divested of their habiliments and the advertising pages have been consigned to the scrap-heap; each volume is clothed in a neat binding, and I have in attractive book form a very comprehensive index to the manifold phases of dentistry from 1866 to the present time. As I review from time to time these forty-three volumes, indicating as many years of continuous advancement in the science of dentistry, I am awed to think how much the profession really owes to this one publication alone. In these volumes we seem to hear the voices of idols who have passed beyond. So faithfully are their writings portrayed and so well edited that we have but praise to offer; and I say God-speed to any medium that has been instrumental in helping to lift a profession from the mire of empiricism to a higher plane,—that of science.

We may reason *a priori* or *a posteriori*, or we may reason as did the aged farmer who visited a circus for the first time and stood before the dromedary's cage, eyes bulging and mouth agape at the strange beast within. The circus proper began and the crowds left for the main show, but still the old man stood before the cage in stunned silence, appraising every detail of the misshapen legs, the cloven

hoofs, the pendulous upper lip, and the curiously mounded back of the sleepy-eyed beast. Fifteen minutes passed. Then the farmer turned away and spat disgustedly. "Gosh! there ain't no such animal!" Reason as we may, the fundamental principle upon which advancement is based is science, either classified or unclassified. When classified it is tractable and subservient to the interests of humanity; when unclassified it is viewed in the light of miracles, but even in this latter form it is useful, for it makes men think.

So I say, let us peruse the literature at our command, and when we shall, as a consequence, have recovered from our microcephalia, we shall be seen and heard clamoring for a high-class professional publication. The desire will be upon us, for we shall have discovered that our most valuable asset, the nucleus given us by our alma mater, becomes transcendent only when we realize that graduation tends simply to fit us for a long term of student life in the great college whose curriculum is confined to imparting particular knowledge in general and general knowledge in particular.

Carlyle, perceiving the benefits that would naturally accrue from a desire for knowledge, said: "If I had my way, I would send the sons of poor men to college, and the sons of rich men I would set to work." That he realized the value of knowledge is fully proved by the additional quotation: "That there should one man die ignorant who is capable of knowledge, this I call a tragedy."

Let us be students, and being students eschew chimerical graduation, egotistic titles, and imaginary proficiency. We cannot all ascend the ladder of fame by delving into the abstrusities of scientific research, nor are we all adapted to producing high-class literary efforts; but each and every one of us can, by cultivating altruistic tendencies, lend a helping hand to our benefactors, and incidentally to humanity as well.

Being human, men are the better fitted to evolve noble thoughts and enact noble deeds when their efforts are appreciated by their fellow men. In the profession

today we have men who are lending a powerful influence—moral, literary, and scientific—to the advancement of dentistry. Let us not pass idly by such magnificent philanthropic examples as Black, Talbot, Truman, and many others, but rather let us pay tribute to them while they are still in the flesh, and not wait, as did Mark Antony as he stood by the dead body of his beloved chief, to sadly muse, "Thou art the ruins of the noblest man that ever lived in the tide of time." Let us, my friends, as honest men protected by the spotless name of an honorable and praiseworthy profession, show our appreciation not only to our benefactors, past and present, but to the mediums that have reflected the thoughts of these great men; for without these mediums—call them by whatever name you choose—we would in many instances have been lamentably ignorant of the achievements of our colleagues, and in consequence humanity in general would have suffered.

"It is true, no age can restore life, whereof perhaps there is no great loss; and revolutions of ages do not oft recover the loss of a rejected truth for want of which whole nations fare the worse. We should be wary therefore what persecutions we raise against the living labors of public men, how we spill that seasoned life of man preserved and stored up in books, since we see a kind of homicide may be thus committed,

sometimes a martyrdom; and if it extend to the whole impression, a kind of massacre, whereof the execution ends not in the slaying of an elemental life, but strikes at the ethereal and fifth essence, the breath of reason itself—slays an immortality rather than a life."

Worthy and faithful as has been our periodical literature, it must of necessity be deficient in, for instance, editorial comment—favorable or adverse—respecting dental materials; for no difference which way the editorial ink might splatter, contumelious comment would be forthcoming. We need these editorial comments, and we need a great deal more. We need detailed authoritative opinions and data respecting the manifold phases of the various materials and theories which we are called upon to employ. We need experts employed by the profession to analyze and conduct experiments with the various cements, alloys, medicaments, anesthetics, etc., and report results. We need a larger and more enthusiastic membership in the local and state societies. We need more high-class literature. We need a publication issued by the profession. In fact, we need a whole heap of good things, we cannot have a plethora; but what is of transcendent importance, that upon which all other needs are dependent, that which we need most, is a healthy, robust, earnest desire for the advancement of dental science for humanity's sake.

NASAL OBSTRUCTION AND CONSEQUENT MOUTH-BREATHING— ITS RELATION TO DENTISTRY.

By MERVYN ROSS TAYLOR, M.D., Philadelphia, Pa.

AT the present time the dental profession has awakened to the realization that in order to successfully correct irregularities of the teeth and jaws it is first necessary, before commencing any corrective treatment, to re-

move all existing obstructions in the nose and naso-pharynx.

It has been shown that in the vast majority of cases requiring an orthodontic procedure, obstructions of varying degrees exist in these parts, so that in

order to obtain good results proper nasal breathing must be assured. How this can be accomplished, together with a brief review of the etiological factors in the causation of these irregularities, is what the author hopes to make clear in the following remarks, being prompted to this course by the closer affiliation that now exists between the dental practitioner and the rhinologist, which affiliation has resulted in making possible the many remarkable results obtained at the present time by orthodontia and facial orthopedia.

The dentist's responsibility, arising directly from the co-relation of oral and naso-pharyngeal disease, is probably greater than many have realized. This appears but natural when it is remembered that a knowledge of this special relation, and of its importance from both the medical and the dental stand-points, has only recently been recognized and studied, although up to the present time the teaching in the dental colleges on this pathological relationship has been markedly deficient, and it is to be hoped that in the near future this course will be made a part of the medical and dental curricula.

In order to properly appreciate the importance of disease in the upper respiratory tract and its relation to malocclusion and asymmetry of the jaws and face, the dental surgeon should first review his knowledge of the anatomy and physiology of the nose and upper pharynx. The normal functions of these organs should be remembered, together with the effects produced by nasal and faucial stenosis upon the normal contour and expression of the face and teeth. Besides, the habits formed by each patient are to be studied, and finally definite conclusions arrived at as to the pathologic causes productive of the conditions for which the patient seeks a remedy.

Inspection, then, is of the utmost importance, especially between the ages of four and twenty, as during this period the best results can be obtained from corrective surgery. It is to be remembered that nothing in nature is absolutely

symmetrical, and particularly is this true of the nasal cavity, where even approximate symmetry is seldom found, and where marked states of nasal obstruction are frequent.

The nose from a physiological standpoint has four general functions, respiratory, auditory, olfactory, and vocal, each function depending upon its proper histological and anatomical normality. Nature intended that the nose, not the mouth, should be the proper channel through which we breathe, and this is shown by the changes which the air undergoes during its passage through the organ. The air entering the nostrils is rendered free of dust and other foreign matter by a filtration process accomplished by a meshwork of fine hair situated in the vestibule of the nose. At the same time the ingenious arrangement of the turbinate bodies—covered as they are with mucous membrane the surface of which is constantly bathed with moist mucus—enables them to catch the dust and bacteria, and by an arrangement of cilia whip foreign material back toward the entrance of the nose, thus preventing its downward course into the lungs.

Then again, the interior of the nose is endowed with an abundant blood supply, and the mucous membrane is exceedingly active in the production of a copious mucous secretion. These two factors are useful in warming and moistening the inspired air, so that it reaches the lungs in a warm and moistened state. Experiments have proved that the secretions are endowed more or less with germicidal action, and that, according to Piaget, the post-nasal cavity is nearly free from germs.

This, then, is surely incontrovertible evidence that the normal respiratory function in man was intended by nature to be carried on through the pathway of the nostrils, as seen in almost all of the lower animals. What then are the causes of mouth-breathing? What part does it play in the asymmetrical development of the face, the dental and maxillary arches? What other ill effects occur in the habitual mouth-breather? and lastly, what treatment is necessary from

the rhinologist's standpoint to correct these conditions? These questions I shall attempt to satisfactorily answer.

In the first place, obstruction, faulty development, bad habits, and malocclusion can undoubtedly be prevented in the beginning, for prophylaxis here is just as ideal a form of treatment as it is anywhere throughout the vast domain of preventive medicine, provided the child is seen early enough, and as the children are seen by dentists between the ages of two and seven years, there is an opportunity to note the symptoms of nasal obstruction occurring in the little patients at a time when corrective treatment—that is, the removal of obstructions in the nose and naso-pharynx—will be all that is necessary for preventing the facial disfigurement resulting from obstruction in proper breathing, with a train of other evil consequences which, once established, may require months of tedious treatment to correct.

In the so-called mild cases of nasal obstruction—that is, in cases in which little outward signs of mouth-breathing are present, or perhaps not at all in evidence during the day and seen only during sleep—by reason of such obscurity the nature of the condition is not discovered early, or else by ignorant or wilful neglect the child is allowed to drift on for years without proper treatment, the children frequently developing graver constitutional disorders than arise in the more marked cases of nasal obstruction, or in those in which the outward and visible signs of the condition from which they are suffering are beyond concealment and therefore easy to recognize. Likewise, severe disorders of hearing, smelling, and vision may complicate such seemingly mild cases, to say nothing of progressive ill-health and general nervous disorders, all resulting without asymmetry or developed malformations in the teeth or jaws.

In my experience of 215 cases between the ages of two and fifteen, that were referred to me for examination and opinion during the years 1907 and 1908, I found that the most common cause of nasal stenosis and consequent

mouth-breathing was adenoids, or hypertrophy of the pharyngeal tonsil. In the nose and throat clinics of St. Joseph's Hospital there were treated 361 children, fifteen years of age or under. The records of diagnoses made show that over 70.5 per cent. were suffering from adenoids and hypertrophied tonsils. These figures show the prominence of adenoids as a pathological factor in habitual mouth-breathing. Indeed, adenoids accounted for over 65 per cent. of my private cases presenting coincident dental irregularities; so that they are to be looked upon as the most significant factor.

Adenoids are hypertrophied lymph-glands situated not in the nasal passages proper but upon the posterior wall of the naso-pharynx. In structure they are less fibrous than the faucial tonsils and are capable, by irritation, inflammation, and infection, of becoming very much hypertrophied, so that in many cases they entirely block the naso-pharyngeal space. They occur more often in early childhood than at any other time, because the tissue is soft and friable and therefore more susceptible to infection, which is not the case in adults. From their location it is evident that even slight encroachment upon this already narrow space will interfere seriously with nasal respiration, forcing the child to open the mouth in order to breathe. As I have said, in mild cases this may be only apparent at night, when the child will snore or breathe heavily, sleep being much disturbed. The child sleeps in all sorts of positions, or tosses restlessly about the crib in the vain endeavor to find some position in which respiration is easy. Mouth-breathing may be noticed only after active exercise. Frequently these children suffer from a slight hacking cough. Their susceptibility to catching cold is increased, with a consequent coryza or "running at the nose," or "posterior dropping," which occurs from a gradual collection of inspissated and thick mucus secreted by the adenoids and this from time to time slowly runs down the posterior pharyngeal wall, giving rise to frequent hawking. Climatic

changes produce variations in these catarrhal symptoms, they being usually worse in damp and cold weather. As a result of the nasal obstruction the voice assumes a nasal or muffled quality. The facial expression varies with the degree of obstruction and according to the length of time the child has suffered from it. In cases of long standing we find a distinctive facial expression about the eyes, nose, and mouth. The resulting deformities and irregularities which are of particular interest to the dentist assume many types—as malocclusions characterized by lateral contraction of one or both jaws, recession of the mandible and lack of anterior occlusion—to say nothing of many other deformities, as abnormally high arching of the palate and the development of the familiar pigeon-shaped chest. Varying degrees of deafness occur, owing to an extension of the catarrhal inflammation into the middle ear, and also reflex nervous and constitutional disorders varying all the way from a mild state of physical indisposition hardly recognizable to a condition of active mental deficiency and extreme ill-health.

Holt asserts that adenoids are the source of more discomfort and the cause of more minor ailments than almost any other pathological condition. The age in which adenoids are most prevalent and at the same time most potent for harm is between four and eight. It is therefore essential that they be removed at this time, so that the normal dome-shaped arch will be formed, proper occlusion of the teeth secured, and good health restored. Greater success will be obtained provided the child has not developed bad habits, which are so difficult to correct. Head and jaw bandages and other appliances may be necessary after operation in order to keep the mouth closed and re-establish proper habits in nasal respiration, but in my experience more can be accomplished by systematic exercise in nasal inhalation and exhalation.

Occurring either independently or coincidentally with adenoid vegetations in the naso-pharynx is chronic enlargement

of the faucial tonsils. Normally they should be the size of small almonds, but often through chronic inflammation they enlarge to the size of horse-chestnuts. Much discussion has arisen about their functions, but in the light of our present knowledge they should be looked upon more as death-traps than anything else. Their histological structure makes them particularly adapted for the absorption of pathologic bacteria into our bodies. The tonsils consist of a mesh-like structure filled with little crypts, numbering from eight to twenty. Through these crypts the tonsils become infected, endangering the health of the individual. Mouth-breathing is favored by their enlargement, and because of their position malocclusion readily develops. Hence the plea for their early removal when evidences of hypertrophy are present, and especially should they be removed before corrective appliances are used.

Only second in importance in the category of obstructive lesions, even though less frequent, are septal and turbinal anomalies. The possibility of proper nasal breathing occurs only when the nasal chambers are properly and uniformly developed. Deviation of the septum is a frequent cause of mouth-breathing. Normally the septum of the nose should be straight, but frequently there are found on one side or the other spurs, ridges, or deflections of considerable size. While it must be remembered that few noses are perfectly symmetrical—deviations of a mild extent occurring in all—corrective surgery has only to do with their size and location when they obstruct the free passage of air through the nostrils.

Another cause of mouth-breathing in adults and children is simple hypertrophic and cyst formations of the turbinate bodies. The mucous membrane lining the nose is very sensitive, so that mild or severe states of hyperemia and hypertrophy are prone to occur from slight causes. At the same time the turbinates—there being three in each nostril—are endowed with erectile power, so that from slight causes, as a cold in the head, swelling of these bodies takes place, with increased secretion, produ-

ing interference with nasal respiration which is particularly marked at night. Occasional attacks of short duration may do no special harm, but when recurring frequently and lasting long they develop a condition of chronic hypertrophic rhinitis, which is a chronic thickened state of the turbinate bodies and mucous membrane. It is not uncommon in these states to find a turbinate so large as to completely block a nostril. The treatment for such conditions is not essentially operative, as relief may often be obtained by topical treatments and cauterization. When cystic formations occur, they should be removed.

More rarely are encountered polypi and benign neoplasms, marked forward projection of the vertebral column, paralysis of the soft palate and fauces, and arrested development of the nostrils, any one of which may be exciting factors in the development of mouth-breathing.

What, then, is the general characteristic picture presented in a case suffering from nasal obstruction and prolonged mouth-breathing? The nose is seen to be narrow and pinched, the facial muscles are drawn down, giving an elongated and pinched appearance. The general expression is vacant and listless. The upper jaw, by reason of the constant pressure of the cheek muscles and absence of support of lip and tongue resistance, is lengthened in its antero-posterior diameter. The alveolar process is forced down, and in consequence the arch becomes high and V-shaped, with resulting irregularity of the teeth. The breath is fetid, the voice assumes a nasal quality,

and the patient finds difficulty in properly blowing the nose.

It is to be remembered that irregularities of the teeth do not occur with the deciduous dentition, but with the second denture.

I hope to have shown sufficiently clearly the vital necessity of an early and accurate diagnosis of these states and the institution without delay of proper treatment. Also that the responsibility for diagnosis and advice regarding treatment does not rest with the medical man alone, for, as I have already said, the dentist sees probably a greater number of these cases in their incipency, so that he should have at least a general understanding of the symptoms to be looked for in such cases, in order that preventive treatment may be instituted early.

In closing, may I express the hope that in this broad and useful field of preventive medicine, where by early diagnosis and treatment so much can be accomplished for the common good of humanity, the specialties of dentistry and rhinology may still continue the close affiliation now established, rendering more and more good to one another in a common and glorious cause.

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MILD SEDATIVES IN DENTAL PRACTICE.

By ANTON J. HECKER, D.D.S., New York, N. Y.

ABOUT one year ago my attention was directed to bromural, a new nerve sedative, which had already been employed with pronounced success by prominent physicians both in America and Europe. After having obtained further information upon the properties and use of the drug, and being convinced, through an abundant literature and reports on exhaustive clinical tests with the same, of its harmless nature and freedom from narcotic effects, I concluded to try it extensively on nervous dental patients.

Bromural is a bromid of the valeric group — alphamonobrom-isovaleryl-urea, of the formula



It is obtained by combining urea with brom-isovaleryl bromid, and in physiological action stands between the bromids and valerian preparations on the one side, and the hypnotics, such as veronal, etc., on the other. It occurs as a white crystalline powder of silky appearance, has a slightly bitter taste, and is soluble in hot water, ether, alcohol, and alkalis. The odor is suggestive of valeric acid.

The sedative and hypnotic action of bromural is said to be due to the isopropyl group contained in the valeric acid, whose potency is accentuated by the bromin atom.

The drug should not be classed with the bromin preparations, since the bromin contained in bromural is only split off when the whole molecule is oxidized. This process requires several hours. The small amount of bromin (0.1 to 2.4) would not suffice to explain the hypnotic action of bromural.

It is in the market in the form of

powder and also in the convenient shape of five-grain tablets, which readily disintegrate in a tablespoonful of water, which is a good way to take the drug. Bromural gives all the nerve-sedative effects of the bromids without causing their untoward after-effects. It is said to pass unaltered through the stomach, but is dissolved in the intestinal tract and is then absorbed into the circulation. Ultimately a complete oxidation takes place, so that the preparation is completely transformed within five hours and is soon excreted from the organism.

All that is said in the literature about its quieting and soothing effect upon the nervous system pointed to the supposition that bromural might be of value in the treatment of those patients who come to us in such an excited or hysterical condition that very often they are not fit to be operated upon.

Out of a total of 64 cases that I have observed during the last ten months, 51 cases were of this kind. In these cases the excitement or nervousness of the patients presenting themselves for a dental operation was so marked that it seriously interfered with my work. The results obtained with bromural in these cases were uniformly better than expected, and the remedy proved to be of inestimable value. The drug was given to the patients while waiting for treatment.

The following results were obtained: Five grains quieted the nerves completely in 6 cases of children between twelve and seventeen years, and in 37 cases of women over eighteen years. Ten grains were necessary in 5 cases of women over eighteen years, and in 3 cases of men from twenty-three to forty-two years of age.

In one case, that of a man twenty-five years of age, 15 grains had no effect, his

fear being so great that treatment was not begun. In all the other cases the patients quieted down in thirty to fifty minutes so that the treatment could be carried out without difficulty. Disagreeable after-effects were not observed or reported to me in any single instance.

In 11 cases the bromural was given after midnight for insomnia due to toothache.

Five grains was sufficient to quiet the nerves and induce sleep in 7 cases; in only 2 cases was it necessary to give ten grains.

Two patients did not sleep after three tablets of five grains each were administered during intervals of fifteen minutes. It may, however, be stated that in general bromural is serviceable only where a sedative and mild hypnotic is indicated. It has been pointed out repeatedly in the literature that the drug is too mild wherever there are acute pains or severe organic disease. It seems to me, therefore, that in these latter cases we must naturally not expect great results.

Two other cases not belonging to the domain of dentistry may be reported,

since they illustrate the beneficial action of bromural.

(1) A Wall-street broker told me that he intended to consult me as soon as he had lost his extreme nervousness and insomnia. I gave him some bromural tablets and despite the fact that he had suffered from insomnia for weeks, owing to financial losses, he slept promptly after taking a single five-grain bromural tablet. After three days he was able to undergo a painful dental operation.

(2) A bachelor, fifty-two years of age, who had led a rather fast life and had been addicted to drink, suffered intensely from insomnia and tremor. He obtained such excellent results from bromural (five-grain tablets) that he took the drug regularly for a long time. No habit was established and no evil constitutional effects could be observed.

I am firmly convinced that bromural is destined to become recognized as a valuable drug in dental practice, and trust that these lines will induce my colleagues to employ it and eventually to give further reports upon the results obtained from its use.

PROCEEDINGS OF SOCIETIES.

NATIONAL DENTAL ASSOCIATION.

Thirteenth Annual Meeting, Birmingham, Ala., March 30 to April 2, 1909.

GENERAL SESSIONS.

TUESDAY—*First Session.*

THE first general session of the thirteenth annual meeting of the National Dental Association was called to order at 10 o'clock Tuesday morning, March 30th, by the president, Dr. V. E. Turner, Raleigh, N. C.

The President introduced the Rev. Dr. Sterling Foster of Birmingham, who invoked the divine blessing on the deliberations of the association.

The Executive Council, through the chairman, Dr. H. J. Burkhart, presented as its report the program for the first two days of the meeting, and on motion the report was adopted.

The President then introduced Mr. J. R. Copeland, Birmingham, who welcomed the association to Birmingham on behalf of the city authorities.

Dr. L. F. Luckie, Birmingham, chairman of the Local Committee of Arrangements, welcomed the association on behalf of the dental profession of Alabama.

Dr. J. Y. Crawford, Nashville, Tenn., responded to the addresses of welcome on behalf of the National Dental Association.

Dr. William Crenshaw, vice-president from the South, was called to the chair, and the president, Dr. V. E. Turner, read his annual address.

Dr. Crenshaw appointed the following as the Committee on the President's

Address, with instructions that they report to the general body at a later session: Dr. B. Holly Smith, Baltimore; Dr. William Carr, New York, and Dr. Burton Lee Thorpe, St. Louis.

The President resumed the chair and announced as the next item on the program the reading of a paper by Dr. E. C. KIRK, Philadelphia, Pa., entitled, "The Dental Relationships of Arthritism."

[This paper is printed in full at page 793 of the present issue of the Cosmos.]

Discussion.

Dr. G. V. I. BROWN, Milwaukee, Wis. I am grateful for this opportunity to say how much I appreciate the paper. In the first place, one of the valuable points which impressed me was the fact that Dr. Kirk has laid such a complete, systematic, and of course orderly foundation based upon facts that are undisputed among investigators not only in this country, but in other countries as well, so that we might be prepared to understand the statements which follow. I think a great deal of the trouble that we have had in the past has been that men who have studied the subject extensively have brought the developments and results of their investigations, and expected our minds to receive them as they themselves understand them after years of thought, and therefore what they have given us has not been properly digested in more senses than one.

The second feature of the paper that impressed me as valuable was the fact that Dr. Kirk has endeavored to bring the light of medical and pathological research of a general character before us in such a manner as to focus it upon our own field of investigation, so that one in studying the work and results that have been obtained in this division is at once put in touch with the great investigators and the vast amount of research that is developing other branches of pathological science.

I should like to ask Dr. Kirk to tell us whether he tested the individual whose case he described with regard to other portions of his body than those mentioned, and whether he has sections of the different vital organs? I have a report from one patient who had very much the same difficulty, with some such condition as described by Dr. Kirk, who appeared to have pyorrhea alveolaris or at least ulcerative stomatitis or some similar disease affecting the structures around his teeth, and we found upon post-mortem examination of tissue with the microscope the same round-celled infiltration, and a similar destructive process going on in every vital organ of the body, just as we found in the alveolar structures and mucous membrane of the mouth. I am inclined to believe that the individual Dr. Kirk cited would have shown similar infiltration of the different organs of the body. In the case I speak of, we had a well-defined leukemia, as indicated by the blood count. I know that in Dr. Kirk's case all these matters must undoubtedly have been considered by those in charge, and had there been any great abnormality in the number of red and white corpuscles or notable factors especially indicated in the blood examination, such facts would have been included in his description.

There is one point, however, that is still of interest to us in this matter, which was referred to by the essayist, and that is the question of opsonic index. He calls our attention to this, and with due consideration we must consider that in addition to the question of imperfect metabolism and all that Dr. Kirk has included

in the term arthritism, there is yet to be developed another factor which bears upon the question of immunity, and the best example that I can give is shown in the treatment of tuberculosis. Tuberculosis, aside from its well understood bacteriologic factor, is definitely recognized as a disease of malnutrition, and the chief consideration in its modern general treatment is in the direction of more air, in order that there may be better oxygenation, therefore more perfect metabolism, and an increased amount of carefully selected food for the purpose of changing the food element which is so needed in these cases. I have recently had the opportunity of having under observation in hospitals quite a number of patients who were being treated from time to time with tuberculin injections for the purpose of creating an immunity to the disease, and the evidence borne by these patients is very important for us in consideration of our present subject, because patients being treated may have tubercular necrosis in any or various parts of the body. Some of these patients were affected by hip-joint disease, others had abdominal abscess, others still, affections of the bones of the feet, the hands, etc. All bore evidence of extensive destruction of the affected tissues, but all were, or seemed to be, in course of recovery under approved general treatment supplemented by injections of tuberculin.

I believe that before we can fully solve the problems of the subject now so ably spread before us we shall be required to go somewhat beyond this question of metabolism and search a little farther for the full and complete answer to that which may, for the present, be termed immunity to disease, in other words, lessened susceptibility of the tissues in this region to those pathologic affections which are favored by the constitutional conditions referred to. I am, as you all know, a very firm believer in the constitutional relationship of the oral cavity, and I have carefully followed the work of Dr. Talbot, which has been so plain to me for years that I have often wondered how anyone ever questioned its

importance. Nevertheless, there are local factors that require our attention, because the reason why these conditions are manifested so frequently in the mouth are: First, we have structures which are somewhat less resistant by reason of their transitory character and by reason of the peculiar vascular supply of the parts—therefore all disorders are manifested quickly in the gingival region and in the alveolar structures; secondly, there is always an opportunity for bacteria to gain entrance, and thirdly, there is an ever-present opportunity for local irritation. Therefore, if I take the view correctly from Dr. Kirk's paper as I understand it from hearing it read—not having had an opportunity to study it in advance—the lesson is, that whatever our treatment be, we must direct our extreme efforts toward overcoming the constitutional conditions, and then must supplement that with the best local treatment our utmost skill may devise, in order that there may be less tendency for excursion of disease in this region.

I believe this paper will do a great deal of good, and I thank you for your courteous attention.

On motion the discussion was postponed until Wednesday at 12 o'clock. The general session then adjourned until Wednesday at 12 o'clock.

WEDNESDAY—*Second Session.*

The general session was called to order Wednesday morning, March 31st, at 12 o'clock, by the president, Dr. Turner.

The first order of business was the report of the Executive Council by the chairman, Dr. Burkhart, which was received and adopted.

The next order of business was the continuation of the discussion of Dr. Kirk's paper read at the first general session.

Discussion—continued.

Dr. M. L. RHEIN, New York, N. Y. It is a very difficult matter to resume the discussion the following day upon a subject that perhaps a large portion of those present have not even heard, and the time allotted for it is so limited

that what I shall have to say will be brief, serving the purpose of emphasizing some of the points which the essayist has made in his very valuable paper.

A more logical analysis of the etiology of this phase of malnutrition has never been presented to any association, nor has any more logical analysis of the subject ever been published. We were very fortunate last year to receive a magnificent contribution on this theme from Professor Leary of Boston, and this particular paper is a worthy addition to the same. I want, as I did last year, to point with special emphasis to the fact that the subject-matter with which the essayist dealt yesterday was entirely upon one phase of the symptoms we meet as dentists in the condition generally spoken of as pyorrhea alveolaris, interstitial gingivitis, Riggs' disease, or by whatever name you choose to call it. Practically the same condition existed last year—for the essayist at that time, Professor Leary, simply dwelt upon one etiological factor, just as Professor Kirk yesterday devoted his attention to one etiological factor, and it is this point that is of special importance. These are the class of contributions we have wanted for some time. This condition of the diseased pericemental tissues, surrounded perhaps by a purulent discharge, has generally been considered and discussed as a whole, and I wish here to emphasize the importance of taking up and considering this pathological subject in its different phases, as was so beautifully demonstrated last year at Boston, just as yesterday by the essayist. Attention was devoted yesterday especially to the study of the effects of intestinal auto-intoxication, or intestinal intoxication, take it as you will, and the forms of malnutrition resulting therefrom and showing themselves to us in a diseased condition of the pericemental tissues.

I do not believe that anyone who listened to the paper yesterday can fail to be convinced or see the corollary there presented, that these disease conditions that we meet so often are symptoms of the malnutrition produced by the initial toxic condition that eventually brought about the various diseases there

enumerated. The essayist devoted considerable time to one particular condition, the diabetic condition, hoping, I have no doubt, by concentrating his thought on this point to show more conclusively the story of cause and effect.

In the course of his paper he spoke of a communication published by Dr. Richards of New York, asking for our aid in presenting to him such cases of pyorrhea alveolaris, if you choose to call it such, where the diabetic condition existed, and the effect of the cure of the pyorrhea upon the diabetic condition. I received a similar communication from Dr. Richards, and my reply was that it was impossible to reply intelligently to his proposition, because he was placing the cart before the horse; that the symptoms such as we meet are the results of the diabetic condition and that the diabetic condition would have to be brought under control before any work on our part would have any material result. It has been frequently asserted by dentists who have taken this erroneous, illogical, pathological hypothesis in the same manner as Dr. Richards, that the swallowing of ordinary bacteria was sufficient to produce such poisons and toxic conditions as to bring about that general condition. The careful study, however, of the recognized scientific pathology of today shows the fallacy of such a conclusion so completely that in view of the time allotted to the discussion of this paper it is unnecessary to go into this feature. The essayist definitely pointed out the fallacy of any such conclusion. The ordinary bacteria that are swallowed, whether with the food or otherwise, are thoroughly taken care of in the intestinal tract, if the system is in proper condition. It is granted that where a severe pyorrheal condition exists, there is no doubt at all that the swallowing of large amounts of purulent matter aggravates the toxic conditions of this tract, but that it is the initial factor in producing such a diseased condition is contrary to every physiologic fact that we have at our command. The one point that I wish to make in the discussion of this subject is to draw attention strongly to the fact that the teachings which have been given

to us by some men, namely, that the time to clean the mouth is before eating, so that people shall not swallow their food filled with bacteria, are simply not only illogical but at variance with the best results which have been determined prophylactically. Such remains of food should be removed after the meal, not allowing it to remain in the mouth until the next meal.

Dr. EMORY A. BRYANT, Washington, D. C. Being merely a practical man, it is with a great deal of temerity that I rise to discuss this paper, and the only reason I have for discussing it is a practical one.

When I read the title of the paper, "Dental Relationships of Arthritism," I tried to understand what the subject-matter would be, judging from its title, and judging from results it was a lamentable failure, and as a practical illustration I venture to say that there are not five men in the house who can give the definition of arthritism. There are some members of our profession who have a great tendency to take up high-sounding names and use them, while the terminology used could be more practical and such with which we are familiar and which is in general use. As this was evidently a medical term, I asked several of the leading physicians in Washington if they could tell me from the title of the paper what the subject-matter might cover, but not one could tell me. My conversation with one medical specialist brought out the fact that he had never heard of the term arthritism, but that the word evidently is derived from or has connection with arthritis, and refers to the gouty diathesis. I then went to the medical dictionaries, and after wandering through two and finding nothing to enlighten me, finally obtained a copy of the latest editions and there found the word itself.

I refer to this because the practical man, or the man who does not obtain advance copies of a paper, has to figure out what the essayist means to cover by the title alone. Judging from what I have heard and remember of the paper, it is a magnificent paper upon the subjects of malnutrition, auto-intoxication,

diabetes, pyorrhea alveolaris, and the gouty diathesis. The term "arthritis" is generally used to signify any disease whatever involving a joint. It is also employed to designate inflammation of all the structures forming the joint, as distinguished from mere synovitis: "The causes of joint disease in general are connected either with disordered nutrition, in which case it assumes the inflammatory type, or with disordered function; the latter may depend upon the former or be unconnected with it, or again the cause may be local in its origin or arise from a constitutional defect."

Again, when we refer to the medical works under the head of "joints," we find that the word refers more especially to one which admits of more or less motion in one or both bones. Taking this fact, and considering that all of the diseases referred to under the term of arthritis pertain only to joints of this description, naturally we should infer from the title of the paper that it covers subject-matter pertaining to a joint of this description, which takes us to the articulation of the inferior with the superior maxillary, the only joint composed of tissues in which disease of the malnutrition or auto-intoxication type may be supposed to arise; but as I understand the paper, it does not refer to this joint at all. I fail to observe as a practical man anything in the paper that relates to a joint in the generally accepted meaning of that word. Perhaps I fail to grasp the situation, and that may be because my practical ideas are not educated up to the standard of the scientist. You know the story of the boy who asked his father what a scientist was, and the father answered, "A scientist, my son, is a man who can tell you the things you already know, in such unfamiliar language that you regard it as something new."

The case which the essayist mentioned where death occurred was, if I may judge upon its face, simply necrosis caused by external infection and not auto-intoxication. I may be mistaken, but I do not think so, and perhaps if I had had the opportunity to inspect the paper before the discussion, I might have come closer to what the essayist has in mind as well

as to the probable cause, but not having had a copy, I can only make conjectures.

Regarding some matter referred to by the essayist I have to say something that may be of interest, perhaps of information to you. We have for several years been entertained by articles on gouty diathesis, faulty metabolism, etc., with a special emphasis upon uric acid in the blood as being the cause of pyorrhea alveolaris, etc. I want to at least correct an impression that seems to have become fastened upon the mind of the dental profession with regard to uric acid and the dire results which it is supposed to incur in the field of our work, and to that end I will read an extract from "Osler's Modern Medicine," by Thomas B. Fletcher, M.B., of Johns Hopkins Hospital, vol. i, page 811:

From the clinical standpoint, the etiology of gout is closely connected with nitrogen metabolism, and with the formation and excretion of certain compounds of which nitrogen is a component.

There is a steadily growing conviction among the best students of this disease at the present day that uric acid plays little or no part in the actual etiology of gout. Although an excess of uric acid in the blood and of its salts in the tissues dominates the picture in well-marked cases, this excess of uric acid is held to play a secondary part and to be a mere weapon of the disease. There is no experimental proof showing that an excess of uric acid causes any special toxic symptoms. The growing belief is that gout is really a disease of the intermediary metabolism. Origin of the uric acid of the blood: Possibilities are three—(1) The diminished destruction of oxidation. (2) Increased formation. (3) Diminished excretion by the kidneys.

There is an unfortunate tendency on the part of many physicians to ascribe certain obscure symptoms to a so-called uric acid diathesis, especially if they find a deposit of uric acid or urates in the urine, although there is often not a vestige of evidence to justify this view. There are certain health resorts in this country from which nearly every patient comes away imbued with a firm conviction that his blood is filled with uric acid, and that this is responsible for his various nervous features. The patients are usually pleased with the explanation, and it is a difficult task to disabuse their minds of the fallacy. We know now that by far the largest

proportion of uric acid is derived from "endogenous" purins of the body and in much smaller proportion from the "exogenous" purins of the food. It was also claimed that red meats and game were specially to be avoided, but recent investigations by Kaufmann and Mohr show there is no greater uric acid output when a person is fed on red and dark meats than when he is given white meats in the same amounts. If the former are in any way more injurious, this is probably referable largely to the fact that they are less easily digested. The balance of evidence at the present day is against the exclusion of meats and in favor of their being allowed in moderate amounts.

Dr. Fitcher mentions as food to be avoided: Meat extracts, owing to their nitrogenous extracts and salt. Salt fish, fish roe, and caviar, and all highly seasoned foods are forbidden; pepper, paprika, and mustard should not be allowed in dressing, cucumbers and tomatoes, alcoholic drinks, wines, liquors, etc.; but he allows eggs, fresh fish in moderation, milk, starchy foods freely, vegetables, fruit, fats such as butter freely, and plenty of water before breakfast. I bring this out because patients, as well as the members of our own profession, continually refer to the uric acid bugaboo in connection with the treatment of pyorrhea alveolaris, claiming that it must be gotten rid of before we can hope for a successful outcome of our local treatments. It would appear to me as a practical man that it might be well for our profession to allow the medical profession to at least agree upon constitutional cause and effect before we adopt their ideas as facts. I never have believed and I have yet to be shown where there is any constitutional connection which affects pyorrhea alveolaris one way or another, except in the indirect manner in which all disease which tends to lower the tone of the whole system may also affect the tissues surrounding the teeth. From my practical observations pyorrhea appears very strongly to be directly due to inability to properly clean the teeth at the gum margins, owing to whatever cause, and that the deposit of tartar resulting therefrom is a chemical one produced by the affected fluids from the parotid and sublingual and maxillary glands.

Frequently these glands leave a calcic deposit before their fluids meet the fluids of the mouth; why not afterward? We not only cure this condition by local treatment, but in many instances the simple expedient of making the patients change their mastication of food from one side of the mouth to the other immediately changes the calcic deposits to the unused side of the mouth, and eliminates it from the used side. These are merely the observations of every man who attempts to handle pyorrhoeal cases, and who has more or less success with local treatments. If those who believe pyorrhea to be a constitutional disease will take some practical cases, treat them only systematically after one removal of the calcic deposits, and prove that there is no return of the trouble under such treatment, or will show practically that with systematic treatment they can obtain as good or even better results than do the advocates of local treatment, I for one shall be pleased to acknowledge that I have been wrong, and to adopt the right.

I have no further criticism to make, but in closing I wish to say that I hope that our scientific men when they propose to read a paper on a so-called scientific subject will at least give the paper a title by which the practical man may know what the subject-matter will be, so that we may read up enough to be able to comprehend what the essayists are driving at.

Dr. RHEIN. In making a motion that Dr. Kirk be allowed the privilege of closing the discussion on his paper, if he so desires, I wish to add a word. The quotation which was read by Dr. Bryant is a very valuable one to insert in this discussion, as it conforms precisely with every point that was brought out by the essayist. It is unfortunate that Dr. Bryant was unable to appreciate what Dr. Kirk said yesterday, because it forces him to argue against a theory that he is in accord with, and a careful reading of the paper will thoroughly demonstrate that fact.

Dr. J. D. PATTERSON, Kansas City, Mo. This subject is one of great interest to me, but I should not have risen to discuss it had it not been for the

statement made by Dr. Rhein that in the treatment of this distressing disease no material result toward success can be assured until the diabetic condition is cured. With all emphasis, I wish to say that the experience of those who are daily treating this distressing disease is directly contrary to such an opinion. We know that whatever the predisposing condition or the systemic condition may be, if local surgical treatment and sanitation is used there comes at once a remarkable improvement. Nevertheless Dr. Rhein says that there is no material improvement until the systemic condition is corrected.

Dr. RHEIN. What disease are you speaking of?

Dr. PATTERSON. You made the statement that in the disease commonly called pyorrhea alveolaris no material result toward success could be assured until the systemic condition is corrected.

Dr. RHEIN. I said that in the diabetic cases, the diabetic condition should be under control.

Dr. PATTERSON. Let it be so. The fact of the matter is that none of us deny the predisposing influence in this disease. The consideration of systemic conditions which result from nutritional disturbances and which effect pathological conditions in the oral cavity should receive careful study from the members of the dental profession, and the therapy that will correct such predisposition to the loss of the investing membranes of the dental organs should be diligently sought, whether in pyorrhea or in other pathological conditions of the dermal structures. It may be said, however, that the aid of drugs in correcting these systemic conditions must ever be secondary to the surgical treatment.

Dr. Kirk yesterday—and perhaps, as Dr. Rhein says, he was only discussing one phase, and he did it in a well-founded, magnificent and scientific manner—entered the speculative field when he said that nutritional disturbances resulting in faulty metabolism coupled with bacterial invasion caused the disease that we denominate pyorrhea alveolaris, leading us to the fair assumption that the bacteria had some method of entering

that tissue through the nutritional disturbance, faulty metabolism, or auto-intoxication. Now, my claim is that bacterial invasion is not present until there is some solution of the continuity of the gingival order of the gum around the cervix of the tooth, and that these nutritional disturbances never cause that lesion at the gum margin by which the bacteria gain entrance.

I am very much interested in this subject, and I am interested in another thing. I know that the teachings of Dr. Rhein and Dr. Kirk, Dr. Peirce, Dr. Burchard, and others have prevented hundreds and hundreds of competent men all through the West, where I know them best, from interfering with and trying to correct this disease, because they have been taught, as a fair conclusion from all the articles that have appeared from these men, that little or nothing can be done until the systemic condition is corrected; thus, because the disease is one that is hard to control—it is hard for the patient and hard for the operator—and requires more skill and more care than ordinary operations in dentistry, and because they do not like the work, this has given them an excuse not to try to do anything for the relief of sufferers. I know that this is so, and I know that injury has been done in that way, and I wish to protest against it and say that whatever the systemic conditions, the proper surgical local treatment gives immediate and prompt relief; then let it be reinforced with the correction of the systemic condition in whatever way best suits the patient. The best means, as you and I should know, is not therapy, not vaccines, but vigorous exercise, fresh air, good food, sunshine, and good sleep. In this way good blood is gained to enable the tissue to throw off any kind of irritation. Dr. Kirk and others would make you believe, because they say little or nothing about the factor of local irritation, that these conditions are due wholly to nutritional disturbances. I never saw one case, and I have seen hundreds of them, in which I could not say that local irritation was the initiative cause, whatever the systemic condition was. I have records of

hundreds of cases, and have carefully gone into the clinical history of these cases and have published the reports, and I tell you that the people coming to me for treatment of pyorrhea—and my opinion is indorsed by a great many practical men working in this field every day—exhibit no greater percentage of constitutional disturbances than those who come to us for ordinary operations of filling teeth, making plates, crowns, and bridges; a record of several years shows just about ten to fifteen per cent. of such cases. The fact of the matter is that the great majority of people who come for treatment of pyorrhea are remarkably vigorous and healthy. I do not say that without careful observation and inquiry, often consulting the patients' physician to find out if they have any faulty metabolism. People who come to me for pyorrhea treatment show no evidence of faulty nutrition and are not tottering on the brink of the grave from faulty metabolism and auto-intoxications, but they are healthy, vigorous, strong people. When they are asked what their ailment is, they say that there is nothing the matter with them; they are healthy and strong as can be—men and women tell me that same thing—and I assure you that this is true with the vast majority of cases that present in my practice. Keep a record as I have done and see what the result will be.

That reminds me—I am not criticizing anybody, but would emphasize what I am trying to say—disabuse your minds of the idea that you cannot relieve these patients, and by that I mean relieve them from pain, from inflammation, from exudations, from pus; comfort in every way can be restored to these teeth merely with local treatment and sanitation. I know this to be so, and I know it is so because hundreds of practitioners all over the country are successful with local treatment every day; at the same time I do not deny the effect of nutritional disturbances upon the progress of the disease, and that we should join hands with the physician to whom we refer the patient for the correction of that faulty metabolism. I am reminded that the man who read the paper is a

friend of mine, and I believe that the most scientific man we have, and whom I admire very much, is doing injury on account of the fact that he avoids or says little or nothing in all the papers which he has written—and he has written many others on the same line—about the local surgical treatment; and that he is doing that injury by giving to men, to you and me, an excuse not to touch the disease because it is such hard work. I am also reminded that in the same city from which he comes, years ago there were two men of high repute and great attainments who did much for the dental profession, but at the same time did more to injure the dental profession than any two men that ever lived on account of their advocating the filling of root-canals with cotton.

Dr. RHEIN. Just one word of reply to Dr. Patterson. There is nothing in the papers of Dr. Kirk nor in any of mine that does not conform precisely with the position of Dr. Patterson, namely, that surgical treatment should be commenced at the start in every form of this disease, except in cases of diabetes. Modern scientific surgery teaches that surgical interference is not warranted until the diabetic condition is under control, and in all the treatises that I have published on this subject I have excepted this one form of malnutrition. I have warned the profession not to commence local treatment in this particular form of malnutrition until the diabetic condition is under control.

Dr. PATTERSON. Why?

Dr. RHEIN. It would take more time than I have the right to consume to go into the pathology of diabetes, and I am sure that there are many men within the sound of my voice who recognize the correctness of this practice as pertaining to this particular form of disease.*

* At the request of Dr. Rhein, we add the following to clarify his statement of position: "It has been found that when diabetes is not under control, injuries to the tissues are not followed by regeneration but by necrosis. Furthermore, in those diabetics in whom acetone is found to be present, fatal results may be at any moment expected after any form of traumatism."—ED.

Dr. KIRK (closing the discussion). Answering the inquiry made by Dr. Brown, I have to say that no examination was made of the other tissues of the diabetic patient described in my paper for the reason that a post-mortem examination was not permitted by his relatives. I am unable to say whether a blood count was made or not. I fully agree with Dr. Brown in his contention that the vast amount of work which is just now being done in the study of the therapeutic value of vaccines and in their use as agents for creating at least a temporary immunity by raising the opsonic index with reference to certain pathogenic bacteria is a phase of this subject which is of the utmost importance, and one which is giving—indeed, has already given—most encouraging results. As Dr. Rhein has said, however, I endeavored to concentrate my study and direct the attention of this audience to but one phase of this highly complex problem. With Dr. Rhein's remarks and with those of Dr. Brown I am naturally in hearty agreement.

I am at a loss to understand how it is that Dr. Patterson can draw from my paper the conclusions which he seems to have done. He apparently takes me to task for having given to those who are interested in the treatment of that group of gingival inflammations which we collectively speak of as pyorrhea alveolaris an excuse for neglecting their work by the effort which I have made to draw attention to one of the factors in its causation. That type of reasoning it seems to me is like contending that because the path of virtue and honesty may be shown to be difficult, an excuse is therefore given to humanity for immorality and dishonesty. It is true that I have not contributed largely to the literature of the surgical or local treatment of pyorrhea alveolaris. I have not deemed it necessary to do so. There is no subject within the domain of dental literature which has been more voluminously treated and more hopelessly treated. I have recently had occasion to read the page proofs of Dr. Guerini's "History of Dentistry" now issuing from the press, and the record in that publication is re-

markably clear that diseases of the retentive structures of the teeth were recognized and known from the earliest ages of antiquity, and it is further shown that almost from its earliest recognition man has made abortive efforts to correct the disorder by local means. I have not felt it necessary, in view of all that has been done in connection with that aspect of the subject, to add to the general confusion by indicating some other means by which local surgical treatment of pyorrhea may be carried out. In the very beginning I take it for granted that everybody believes, just as Dr. Patterson says he believes, that local surgical treatment is absolutely necessary for the alleviation, and, if I may be permitted the use of the term, the cure, of pyorrhea alveolaris. I agree with all that he has said in favor of local treatment, but I find that, having granted all of that and admitted the possibility of the results which Dr. Patterson claims for his particular modes of treatment, he is nevertheless in agreement with my principal contention after all—for he says, "Whatever the systemic conditions, the proper surgical local treatment gives immediate and prompt relief; then let it be reinforced with the correction of the systemic condition in whatever way best suits the patient." I admit that local treatment gives relief promptly, or as Dr. Patterson puts it, "immediately," but I am convinced that such treatment is not of permanent value in preventing a recurrence of the disorder where mal-nutritional errors exist, and that these must be corrected in order to produce a result which may fairly and honestly be dignified by the name of "a cure." In making this statement I make the distinction between that class of gingival inflammations which are wholly and distinctly the result of filth conditions and due directly to the impingement of accumulations of tartar and infected food débris upon the gingival borders. The cases which I have in mind are not of that type, but are such as I have discussed in the paper which I have had the pleasure of presenting to you.

I hardly know how to characterize the critical remarks of Dr. Bryant. I do not

wish to misjudge his attitude of mind, but I infer that he takes me to task for presenting a paper before the National Dental Association dealing with the subject of pyorrhea alveolaris from a standpoint involving terminology which he does not understand. That is to say, he seems to have called me to account for telling him something that he did not know.

The two principal misdemeanors for which I seem to have been indicted in the discussion are, first, that I have omitted to discuss the local surgical treatment for pyorrhea; and second, that in presenting the subject from another angle of view I have done so in terms that are not intelligible to some of my hearers. For the first, I have already explained that in view of the hoary antiquity of the subject of local surgical treatment for pyorrhea I did not think it necessary to add to the volume of material already written upon that aspect of the question. I have reason to believe that when Ecclesiastes refers to the coming on of that time when "the grinders shall cease because they are few," he referred to or had in mind the loss of the dental apparatus through the agency of senile pyorrhea, and if he had been less poetic and more technical he would have added some directions for the local surgical treatment of the disorder, and I suspect also that had the "sweet singer of Israel" been engaged in a discussion of the same topic and had been met by the criticism that he was presenting the subject in terms not generally understandable he would apply to that criticism the remark which he has recorded with reference to another matter in the one hundred and thirty-ninth Psalm—"Such knowledge is too wonderful and excellent for me; I cannot attain unto it."

The next order of business was the election of officers for the ensuing year and the selection of the time and place for the next annual meeting.

ELECTION OF OFFICERS.

The election of officers for the ensuing year resulted as follows:

President—Burton Lee Thorpe, St. Louis, Mo.

Vice-president from the West—W. T. Chambers, Denver, Colo.

Vice-president from the East—C. W. Rodgers, Boston, Mass.

Vice-president from the South—T. P. Hinman, Atlanta, Ga.

Corresponding Secretary—H. C. Brown, Columbus, Ohio.

Recording Secretary—C. S. Butler, Buffalo, N. Y.

Treasurer—A. R. Melendy, Knoxville, Tenn.

Executive Council—H. J. Burkhart, A. H. Peck, B. Holly Smith, W. E. Boardman, and C. L. Alexander.

The place for the next meeting was decided by vote, and Denver, Colo., was selected, and the third Tuesday in July as the date.

The general session was then declared adjourned until 2.30 P.M.

WEDNESDAY—*Third Session.*

The general session was called to order on Wednesday afternoon at 2.30 o'clock by the president, Dr. V. E. Turner.

The first order of business was the reading of a paper by Dr. JAMES McMANUS, Hartford, Conn., entitled, "A Side-Light on Professional Interest."

[This paper is printed in full at page 821 of the present issue of the COSMOS.]

The discussion of Dr. McManus' paper was postponed until the general session for Thursday at 12 o'clock.

The general session then adjourned until Thursday at 12 o'clock.

THURSDAY—*Fourth Session.*

The fourth general session was called to order by the president Dr. Turner, at 12 o'clock Thursday, April 1st.

The first order of business was the discussion of Dr. McManus' paper, postponed from the previous session.

Discussion.

Dr. J. Y. CRAWFORD, Nashville, Tenn. This has been, in my opinion, one of the

best meetings that the National Association has ever held, and one of the contributions of most value is the paper by Dr. McManus. In addition to the value of that paper from a semi-historical standpoint, the underlying spirit of high fraternity seems to be most important, but in addition to the value of that contribution and its timeliness, we have an object lesson in connection with the paper that I regard of more important value—I refer to the distinguished essayist. If I were called upon to designate one of the most marked and distinguished dental surgeons in America from every standpoint, if I were forced to designate one man that I wanted to lead out and introduce as one of the very best type of dental surgeons, taken altogether from the standpoint of his accomplishments, of loyalty, of physical health, I believe I should select Dr. McManus of Hartford, Conn. In addition to his constant work of forty-four years as a member of this association—I suppose he is the oldest member present—for forty-four years he has been a regular *bona fide* member of the National Dental Association of America, as the present organization is simply a continuation of the old American reinforced by the loyal support of the Southern Dental Association, which was a national organization as well, and it is our particular pride that we of the South took the initiative toward the amalgamation of the two associations, and as a result brought into this body a group of southern men, men in sympathy with the southern idea. I do not offer this as an offense, but to show that in the South we have been interested in the maintenance of the national phase of these questions. It has always seemed to me that Dr. McManus' life was made more beautiful and emphasized more markedly by the fact that he lived in Hartford, Conn., where anesthesia was contributed to the world by a member of our profession. He took an active part in commemorating that event, and when I went to the town of Hartford especially to see him and to pay tribute to Horace Wells—this is the only place where there is a monument in commemoration of that

event—in the beautiful moonlight this gallant gentleman escorted me to the grounds occupied by the state capitol, and there in the moonlight I went on my knees and read the name of Horace Wells. Dr. McManus is more responsible for the erection of that monument than any dental surgeon in the world, and he has come here and has read us a paper imbued with fraternal spirit and presenting an historical phase of marked interest.

One feature that the essayist referred to is the memorial to be founded in honor of the distinguished Miller, of which I heartily approve. The essayist also suggested the propriety of having an organization that would look after the welfare of the indigent dentists, and as well that of their families after they have passed away. We have a report or two every year from the Committee on Necrology, supplementing ordinarily the President's address, in which the sad demise of some of our members is recorded. I find that a very small number die annually, but we all have to die. On the left side of the thoracic cavity there is a great muscular organ known as the heart, which is constantly propelling through our organism the life-blood, but there must come a time when the pulsations of that organ will cease, and when we will be laid still in death. We have all to come to that finality, and one of these days the Committee on Necrology will refer to our demise. I think we should adopt the spirit of this paper, and when we have a report from the Committee on Necrology, each member of the National Dental Association should be willing to walk up and lay a coin of one hundred cents upon the table of the presiding officer, as a gold offering for our indigent members and for the families of those who have died. Dental surgery is a poor profession; we shall always be poor. The element of manual labor enters more into our life-work than into that of any other profession in the world, and that fact will necessarily keep us very largely poor. If we could send to the families of deceased indigent members a nice contribution each year, and if every mem-

ber knew that when he shall journey to that bourn whence no traveler ever returns, his family, if in need, will receive a contribution from each member of the National Association, that would form a bond of union; we could bring the families of the defunct here, and have them conduct a memorial service, and at that service the treasurer of this organization could present them with a check toward which each member of the association has contributed; that would be better than sending stereotype memorial resolutions, flowers, or something of that kind; it would be a kind and at the same time effective measure that would result in making the young men of the country seek membership in the National Association, and instead of having a few hundred, we should have eight or ten thousand members. The spirit of this paper, if promulgated and acted upon by the members of the National Dental Association and the profession in America, would result in increasing our membership more than anything that we have done in the past. This kind of paper and the life-work of this distinguished member of the profession is a good pattern. I do not believe in imitating, but I believe that every young man of our profession should take the life and character of this distinguished gentleman as a pattern in order that his life may fully develop, and may add to the effectiveness and to the strength of the profession he has chosen.

Dr. C. S. BUTLER, Buffalo, N. Y. I think we shall regard the paper Dr. McManus has presented, as we have opportunity to read it more at our leisure, as one of the most valuable presented to this association. Truly enough, it deals largely with the association of the past, but it also projects itself into the future in that it indicates a line of work which would be well for the profession to follow.

It is very proper indeed that this paper should be presented at this meeting, it being the fiftieth anniversary of the organization of this society. You understand of course that this is the American Dental Association organized at Niagara

Falls in 1859, and continued simply under another name, so that this is the fiftieth anniversary of organized dentistry in the United States as applied to a national association; and while many of us grow impatient sometimes and feel that we are not making the progress that we should, yet if we will but run back over these fifty years of history, I think we shall be astonished at the marvelous progress made by the association and the great work accomplished. Perhaps I can indicate in a moment or two a few of the things, which possibly may have been forgotten by some, which the association has undertaken and carried forward during these fifty years.

In the first place, the National Association has developed—or rather, its members are the men who have developed the scientific side of dentistry. Catalog in your minds the scientific men in dentistry in America, and you will find that every one of them, I think without a single exception, has been a member of our National Association. It is the members of this association who have developed our periodical literature, our dental journals. It can be said that there is no dental journal today of any importance that is not edited by a member of this association, and the same can be said without doubt with regard to our more permanent scientific and mechanical literature. This is also true with regard to our educational institutions. Who are the men of the past as well as of the present who have built up our colleges, who have buttressed the profession in every time of stress and strain? Members of our National Association. And it would seem, as we review these facts, that they must awaken a feeling of pride and gratitude for what our association has done for the development of the profession.

Reference was made in the paper to the *personnel* of the teaching faculties of our colleges, and it was regretted by the essayist that we must to such a large degree depend upon medical men for the education and instruction of our students. Probably this could not have been prevented in many of our institu-

tions, yet I hope to see the time when we shall have at least one dental school in this country in which every member of the faculty will be a practicing dentist. I was made cognizant of a fact this morning which I have every reason to believe to be true, considering the source from which it came; that is, that it is impossible to trace thirty per cent. of the graduates of our schools beyond three years succeeding the date of their graduation. Now, if this be a fact, it seems to me that there is a responsibility of great moment to the profession resting upon the faculties of our colleges. What becomes of these thirty per cent. that disappear within three years of the date of their graduation? I do not attempt to say, but it seems to me that if our college men could realize what this great loss means, they would by some method keep a more constant and definite watch over their graduates. While in college the students are surrounded by men engaged in the same kind of work, and have also the encouragement of the faculty to keep them in line; but the moment they get out into the world an inherent weakness exerts itself, and they go down in the struggle for existence. I have long felt that there was one element lacking in the education and preparation of our students for professional work which should be strengthened. I mean the development of a higher moral sense. As a profession, and this I believe has been the leading thought of the paper, the one thing which we most vitally need is a higher appreciation of the professional value of integrity. "Moral integrity as a professional asset" should be so instilled into the mind of the student as to be the governing principle of his after-life. That is the purpose that should be constantly in the minds of our college teachers. They have very largely the molding of not only the present but of the future of our profession, and while we commend them for the great work they have accomplished in the development of our educational institutions and systems, still we must go forward, not only along the lines indicated by the essayist, but in the development of a higher

and fuller appreciation of the value of the moral integrity of the men who are to practice in our profession.

This paper is valuable to us in that it holds up the best there is in our profession, and indicates that we are not only progressing in the right direction, but are progressing more rapidly than we oftentimes ourselves appreciate.

Dr. J. P. GRAY, Nashville, Tenn. I wish to correct a mistake that I think Dr. Butler made in reference to students dropping out of sight. He evidently made a mistake when he said that thirty per cent. of them are lost sight of within three years after their graduation. I believe that seventy-five per cent. of the dentists stick to their profession—fully that many, if not more. I know that this has been the case with schools with which I have been connected, and you will probably find it to be true with others. At present we find more dentists that continue in practice after graduation than ever before in the history of our profession, and they are doing better work.

I want to thank Dr. McManus for speaking with reference to the teachers, bearing more particularly upon the moral condition of the students. I believe that this side is being more carefully considered every year by the teachers. They are realizing more and more the very great responsibility resting upon them in this respect, and the profession is now beginning to appreciate the good work that is being done by the schools. It is only a few years since everybody in the associations was censuring the schools, but today they are speaking kindly of the work that is being done, and I believe that the time is ripe, as the essayist says, for great progress to be made. The association can do much in this direction by sending a better class of men to us and encouraging men of ability to enter the profession, and giving them to understand that when they have finished their school work they are not perfect dentists, but have been given simply a foundation to stand upon, and that is the best we can do. They must not think continually of the money side of their work, of making money and of reaping riches

from it. Dr. McManus will approve of the suggestion that the foundation must be laid in the schools, and that the superstructure must be built by the students afterward and by the encouragement of this body.

Dr. EDWARD C. MILLS, Columbus, Ohio. We have a dental library at Columbus which, in addition to being one of the most complete, has the distinction of being the pioneer of the many public libraries now scattered throughout the country. As secretary of our Library Association, I received an autograph copy of a pamphlet by Dr. James McManus, "Early Record of Dentists in Connecticut."

After perusing that pamphlet, I was impressed with the unselfish interest and vast amount of labor necessary to gather together all the data and information relative to those pioneers in our profession, and to place it in that permanent form for the use of some dental historian at some future date.

Besides hearing his valuable paper, it is an equally great pleasure for me to look upon an old Roman of the dental profession like Dr. McManus, who in spite of his years of toil for the interests of dentistry, still remains the embodiment of great physical strength and endurance. His recreation during a long professional career has been along such lines of work that his name will go down to posterity as the Nestor of dentistry in New England.

Among the many subjects referred to in his paper, one of great interest to us in Ohio is the matter of the Miller memorial. We are entirely in sympathy with this international movement. The great success attendant, and the conditions that have made possible the many triumphs of surgical art during the past few decades is due in a large measure to two men from the ranks of our profession. These great benefactors to suffering humanity have transformed the operating room from a chamber of horrors into a place where one can lie down to pleasant dreams.

Memorials to Horace Wells and W. T. G. Morton were established some fifty

years after their discoveries in anesthesia, at a time when anesthetics had come into such general use that the laity assumed them coeval with the practice of medicine, and the memorials did not do just honor to the discoverers. For these reasons, in order to do full honor to the memory of Dr. Miller, it seems important that immediate action be taken. The profession in Ohio will always feel a sense of pride in the fact that Dr. Miller was one of Ohio's sons, and his name will be added to the galaxy of names which our state has given to dentistry.

Our great profession, as it has evolved from the mysticism of the past, is ever expanding in scientific knowledge, and its possibilities are unfolding proportionately to the demands made upon it by each succeeding generation.

In our onward march, some day we shall approach that western boundary where all science, and art, and religion shall have arrived at a state of perfect development; then we shall find that Willoughby Dayton Miller has contributed materially to the perfection of our noble science. Let us give him an international memorial; after that, gentlemen, let us give him a monument in America.

Dr. B. HOLLY SMITH, Baltimore, Md. I feel privileged to say a few words in regard to the able and entertaining paper read by our dear friend, Dr. McManus. I prize as the most delightful heritage of my professional career the recollection of incidents, experiences, and associations with the older members of the profession of dentistry—many of them have gone to their reward—men who were intimately associated with the distinguished essayist, and the sentimental references to incidents in the life of our association deeply touched and appealed to me.

At our meeting in Boston there appeared before the Executive Council some gentlemen who were not so familiar with the history of the organization of this association, and who talked ruthlessly and almost rudely about the reorganization of the National Dental Association, as if the association had failed of its mission, as though the life-work of these

men of honorable repute, the sacrifices they have made for the perpetuation of this association, were for nothing. A proposition was made for such a reorganization of the National Association as would exclude all possible continuance of our delightful affiliation with the Southern Branch of the National. I saw some time ago that there had been a meeting of modistes, women who meet in council for the propagation of correct forms of dress, and it was suggested that it would be desirable for the ladies to resort to some surgical operation for the removal of the ear, because it was in the way of the high collar now coming into fashion, and they proposed to have the ear removed so that the collar might be extended above the usual location of the ear. It seems to me quite as reasonable—for our present body is the union of the American Dental Association and the Southern Dental Association, with all of the delightful reminiscences of the history of these two bodies—that we should propose to cut off our association with the Southern Branch.

Reminiscences of the history of this association bring me to a very tender consideration, one that the members of this association would perhaps not mind my mentioning. Among us, at almost every meeting, we have had for years a man whom we all love and who because of sickness has been prevented from attending our meeting this year—I refer to our beloved friend, Dr. Frank Holland—and I move that the secretary of this association be authorized to send to Dr. Holland the greetings of this association, with the information that we love him and that we miss him.

Dr. Smith's motion was carried unanimously.

Dr. EMORY A. BRYANT, Washington, D. C. Following my friend, Dr. Smith, I wish to say a few words in regard to the movement to reorganize this association. When I came from the great West into the eastern part of our country I came for one purpose, and that was to try in my humble way, through my inventions and methods, to do something to aid in the progress of my profession.

It was my one ambition, from my college days on to the present time, to do something in my professional work which should receive the recognition of my profession, to gain their esteem and to make a name for myself that would hold an honored place in the history of dentistry. Though I started practice in a mining camp in the Rocky Mountains under the worst conditions that could confront a young man beginning professional life, it did not dampen my ambition, and thinking I had invented something of interest, I traveled East to show my invention, and one of the first men to take me by the hand and encourage me in the work was Dr. McManus of Hartford.

Like others of the West, I concluded that the environment and the opportunities for professional advancement were better here, and I established myself in Washington, identified myself with the local society, and became a member of this organization as its delegate, with the idea that it furnished the associates and the opportunities to bring out the best in man for the benefit of all.

I gave clinics, read papers, and added to my inventions, bending every energy to accomplish the ends I had in view, when unfortunately political topics became involved and I found myself, much against my inclinations, compelled to shift my energies from legitimate professional progress into the whirlpool of dental society politics and organization jealousies, with their attending demoralization of the scientific and practical progress of our professional work, as well as of its workers.

Perhaps I might say, without being wrong, that for the past five or six years I have been engaged in a controversy that may not at the time have appealed to some of the members to be a matter of progress for the profession, but I wish to assure you that one idea has prompted my actions from the start to the finish, and that was, equal rights for all, special privileges for none. The effort to obtain what I have struggled for, as far as this organization is concerned, started at St. Louis some five years ago and ended at this meeting—

that was, that every member of this association should receive equal consideration, the protection of its constitution as well as its penalties, and when matters of general or special interest were brought before this association which involved its membership as well as the dental profession throughout the country, that each member should receive the same consideration as any other member, and receive the same courtesies. While my professional life has also been involved, the principles enunciated have been the predominating feature of the fight I have made. We have practically gone around the circle, and while doing so have encountered those things that appear from time to time in every organization, creating little troubles that, as a stone thrown into still water produces little rings that spread out and grow into seeming billows, cause dissatisfaction with the advancement being made, produce ill temper, prejudiced actions, and apparently demoralization; but notwithstanding all this, we have made decided advances in the material work of our organization. Some of us wanted a reorganization based upon the plan of the American Medical Association, to enlarge the influence, better conditions, and create better progress, just in the same spirit that the gentleman who preceded me reorganized the old American Dental Association and Southern into the present National organization. There has been no movement within my knowledge that has in any way tried to disparage the Southern Branch of the National Dental Association, or in any way to reduce its influence throughout the country. I have been charged with being in sympathy with such a move, but if you will read my letter in the *Items of Interest* of the last issue you will find my position fully stated, as well as my views upon adopting the proposed plan of the American Medical Association.

I am not impressed with the idea that the terms of a constitution are more essential than its observance after adoption, or that the success of the organization may be jeopardized by their close observance at all times. I say to those who

are in control of our organization that, if they will be considerate in their treatment of the younger members and not mix in local society squabbles, they will have no such antagonism as has permeated this organization for the past five years. I do not want to occupy too much of your time with my personal views, but before closing I wish to say a few personal things: I have always wished to work in harmony with this association, and when I have not done so it was because I was forced not to by circumstances over which I had no control. I have in the past said things that have been harsh, but the Lord knows I have had harsh things said against me and without justification. I have been forced to do things that I have been sorry for, and I have done things unthinkingly that I would have apologized for if given the opportunity to do so. Among other things, I have been fighting a fight for my professional life, and I have used every legitimate means and method of warfare at my command to gain my fight, for which I have no apologies to offer; and while I have been engaged in this battle I have to the best of my ability promoted everything that made for progress and the recognition of every member upon an equality. Now, I have done some missionary work through the issuance of a little journal that I published for four months—the *National Dental Critic*—to call the attention of the dental profession and the members of this association to its methods of proceeding along lines that to my mind were not proper. I did not do this with the intention of stirring up strife, but simply to call the attention of the association to matters which they could remedy themselves, and that have been remedied. At St. Louis an amendment to the constitution was offered, which was adopted at Buffalo by a small majority vote, excluding members of local associations from becoming members of this association. When the error of this was demonstrated, this amendment was amended to take in all the members of state societies. This has not fulfilled expectations, and now, with the adoption of the report of

the Committee on By-laws, we will have gotten back to where we started—into troubled waters.

Now, let us get together and work to make this body a representative organization, put every shoulder to the wheel, forget our personal troubles, and work as a unit for the betterment of all. Let us proceed by the best methods, straightforwardly, honestly, and progressively, that every man can freely lend his aid and encouragement to every action we may take. As I said before, I may have done things that were wrong; I may have taken actions that were severe, but I wish to say before sitting down that if I have ever hurt the feelings of any member of this association, I most humbly apologize for it. I wish to say that I want to work in harmony, and I hope that we can go onward without any more of these controversies that in the first place never should have been brought before this association.

Dr. TRUMAN W. BROPHY, Chicago, Ill. Just forty-two years and five hours ago I entered upon the study of dentistry in the city of Chicago, and I have witnessed with a great deal of interest the advancement of the profession since that time. It was my privilege to know many of the men whose names have been presented here today, and to gather from them inspiration that has assisted me in my work. I do not intend to enter into a discussion of the achievements of these men any more than to say that their lives have been to us a great heritage; they have furnished us with material, have enriched the literature of the profession, have enriched our lives by what they have achieved, and we are doubly grateful to them for what has been left us. The dental profession would be indeed very poor had it not been enriched by the lives of the great men that have gone before. Then I was only a boy, less than nineteen years of age, and today I find myself among those regarded as the aged members of the profession. At that time there were no colleges in the South and only one in the West, the one at Cincinnati. Today there are fifty institutions of dental learning in the

United States. Then this association, which may be regarded as a continuance of the old American Dental Association, had only a few members. Today it is enlarged, but I believe that the usefulness of this body would be greater were the membership increased still more. In the city of Chicago we have a local society in which there are about eleven hundred members, and I see no reason why our National Dental Association should not have at least four or five thousand members, and I believe it should be increased to not less than five thousand members in a country where we have thirty-five thousand dentists engaged in practice. We have a disadvantage, however, in the fact that our country is so broad and so long that men cannot attend national meetings as readily as they can the local associations.

In conclusion, I want to pay tribute to my friend Dr. McManus, who has done so much to bring the dental profession prominently before the scientific world. There are probably young men here who do not know what I am about to state. Dr. McManus is the only man in this world who began and successfully carried through the movement toward having erected a monument to the memory of one of the greatest benefactors of the human family. It was Dr. McManus who took steps and pursued them so diligently that in the city of Hartford there stands in bronze a monument to Dr. Horace Wells, the discoverer of anesthesia, and I believe that I am right when I say that it is the only monument erected to a dentist in the world. But he has not finished his work, we are all glad to know, and as the years go on we may expect from him and from his distinguished son a rounding out to the full of the historical literature of our profession which we will all read, as years go by, with satisfaction and with profit.

Dr. McMANUS (closing the discussion). I hope that I can really give a slight idea of what my feelings are after listening to the many complimentary remarks that were made about me.

I wrote this paper at the request of

our honored president. I did not want to do it, because I have done my share in the past, as some may realize from the remarks made by others, and I felt it was time that I should sit in the background and not offer any more papers before this association, but I could not refuse the request of our esteemed president. I did not know what to write about until I had the inspiration that I might be able to offer something of interest by throwing a side-light on the question of professional interest. I wrote the paper, and therein I have given my views, and I want to say that in this, as well as in every paper which I have presented before the association, I wanted to stay as near the truth as I possibly could, and for that reason I wish to make a correction in regard to one thing that I stated. My reason for making this correction is that I have received information this morning—and it was worth coming to this meeting to get that information alone—regarding the number of dentists in this country. I have said that there were forty thousand, but we have not so many in this country. It was a surprise to me to hear this, and it was also a surprise to hear regarding the number of dentists who in three years after graduation seem to drop out of professional life. That may partly account for the membership in the associations of the country being not larger.

I want to say that my object in writing this paper was to call attention to certain facts. In my past career I have tried to uphold as far as possible the action of the colleges, and I have never to my knowledge criticized them uncharitably, and never want to; but the time seemed to have come when it was proper to state some facts before this association, and I am happy to say that the character of the association this year and the number in attendance is a great surprise to me, and a very pleasant one. But, as I say, I wanted to state some facts regarding the work of the colleges, which I have felt of late years have not quite lived up to their opportunities. I do not care to criticize unless I have the facts, and I am now going to make

some statements in regard to the colleges situated near where I live, in order to show you the lack of professional interest on the part of those connected with the colleges. Massachusetts has, according to Polk's Directory, 1862 dentists in the state, and 727 in the city of Boston, and I believe both of these statements to be very nearly accurate; these two colleges, one of which is a university that stands very high in regard to its demand for preliminary instruction and to the general character of its teaching corps, Harvard College, and Tufts College, have together considerably more than one hundred men connected with the teaching and demonstrating faculties, and yet in the entire state of Massachusetts in 1907 there were only twelve members of this association. Last year at the meeting held in Boston special efforts were made, and at that meeting forty-seven members of this association were present. That is the record of last year; out of 727 local dentists and 1862 practitioners in the state, forty-seven were members of the association. Does that show that the members of the profession and the professors and members of the teaching faculties are much interested? Any excuse they may make for not attending the meetings is of no avail when we look around here and see Dr. Black, Dr. Smith, Dr. Carr, Dr. Kirk, Dr. Patterson, and others who have come from long distances, as they have done in the years past, in order to attend these meetings. The men connected with the institutions of the country have not done their duty. However, I said in my paper, and I wish to emphasize it here today, that judging from the interest that was taken in the meeting last year, from the character of the meeting this year, and from the number in attendance, everything looks bright and prosperous for the future.

I have sat here and listened to the kind words spoken about me, and had it not been for the fact that Dr. Crawford in his remarks occasionally put his hand on my shoulder, I should have wondered who it was that he was complimenting so highly. I assure you, gentlemen,

that I most highly appreciate what you have said, and I cannot express to you how much I value the kind treatment I have received from the members of this association from all over the country.

Dr. H. J. BURKHART, chairman of the Council, moved that the paper by Dr.

W. STORER HOW, Philadelphia, Pa., entitled "Doctor of Dental Science," be read by title.

The motion was carried and the paper ordered published in the Transactions of the association.

(To be continued.)

NEW YORK ODONTOLOGICAL SOCIETY.

Monthly Meeting, February 1909.

A REGULAR meeting of the New York Odontological Society was held on Tuesday evening, February 16, 1909, at the Academy of Medicine, No. 17 West Forty-third street, New York city. The president, Dr. W. D. Tracy, occupied the chair and called the meeting to order.

INCIDENTS OF OFFICE PRACTICE.

Dr. WELD. The history of the case which I should like to bring to your notice is very brief. A gentleman thirty-one years of age came to me with the roof of his mouth very much inflamed and swollen; within the mouth there were two fistulæ. There was considerable fluctuation, and I succeeded in evacuating about two drams of pus. After being treated with a hypodermic syringe the swelling went down. The right canine was about to erupt, the tip of the canine showing, as seen in the cast. The right lateral was a dead tooth, filled with cement. I would like to ask the gentlemen present whether they would extract the lateral and allow the canine to erupt. I asked the patient to have an X-ray picture taken, thinking perhaps that the pressure or the presence of so much pus for so long a period might have affected the jaw-bone. I made an arrangement with Dr. Schamberg, but for some reason the patient's wife or aunt objected to the X ray for fear of some assumed danger.

Dr. Schamberg very kindly gave me a picture of a similar yet at the same time dissimilar case, there being in his case only a swelling—no indication of eruption. I will pass his picture around with the cast. I may say that on the right side of the cast it will be seen that a well-developed canine has erupted between the two bicuspid.

The PRESIDENT. Has anyone anything to say in regard to Dr. Weld's cast which has been passed around? Dr. Van Woert, would you extract those impacted teeth, or would you prefer to see an X ray on it?

Dr. VAN WOERT. I believe a radiograph is necessary in all those cases. If the patient is skeptical, or afraid, I would simply drop him, if he would not submit to the rational means of discovering the cause of the trouble.

Dr. GILLETT. If the patient objected to the X ray, I should invite him to go elsewhere for his advice.

Dr. OTTOLENGUI. At that age, thirty-one years, an impacted tooth, according to my experience, will not erupt without considerable assistance, and if the patient objects to the X ray, he would probably also object to the treatment that would be necessary in trying to induce that tooth to erupt; and even then, after all, it might not erupt.

Dr. RHEIN. The first year we had the radiograph a case of this kind pre-

sented itself to me in my regular practice. I gave the mother of the boy a note to Dr. Van Woert in order to have a radiograph of the case taken. The mother came back a week or so later, and said her husband would not have it done. He had read of the terrible destruction that had happened in cases of this kind, and determined that I would have to go on without it. I was doing orthodontia work at that time. I said, "Excuse me, but I will *not* have to go on. If you do not have the radiograph of the case taken, you will have to go somewhere else." She said, "We have always been patients of yours, and do not want to do that." But I said that I did not propose to work in the dark in a case where I could obtain light. She went on to the next block to another dentist. That boy grew up and went to Harvard College, and I saw him a couple of weeks ago. He has a beautiful canine right up in the palate instead of in the arch. The mouth was supposed to have been treated under strictly orthodontic principles, without a radiograph. I do not know what was done, but I wish to emphasize what the duty of the professional man is in cases where patients take that position, as Dr. Van Woert and the other gentlemen have indicated.

The paper of the evening, entitled "The Rational Use of the Cast Gold Inlay," was then read by Dr. RODRIGUES OTTOLENGUI of New York city.

[This paper is printed in full at page 802 of the present issue of the COSMOS.]

Discussion.

Dr. VAN WOERT. I have been very much interested in Dr. Ottolengui's paper, as I always am in anything that he writes. While I cannot agree with him entirely, I feel that on the whole he is very nearly right as far as his deductions go regarding the use of cast gold fillings. There is one point on which I am sorry that he did not say more; that is, the possibility of a perfect occlusion; I have in mind some experiments which I have

made in one case particularly, that of a lady for whom I made a large restoration in a second molar. The molar had migrated and had tipped forward, and I made three fillings. The first filling was made to correspond in shape and contour with the original, sound tooth as nearly as I could do so with gold foil. In other words, it was simply a concave filling, free at the points of contact with the other teeth. The second filling was made so as to conform as nearly as possible with the other teeth in appearance and shape of surface. The third filling was made so as to afford absolute occlusion. While the first filling served its purpose, so to speak, it rocked when the patient was asked to bite on it, and sometimes tipped so that it fell out. The same was the case with the second filling, which as I stated was made to correspond to the other teeth as nearly as possible. The third filling produced an absolute occlusion, and it was absolutely impossible to rock it or to dislodge it even before it had been cemented into place. Knowing the patient well, and realizing that I could correct any shortcoming, I set the second filling, which was the better looking of the first two. That filling was retained for about four or five months, but then it loosened; I took it out, inserting the third filling, which was set immediately. That was one of the first fillings of that kind that I made; it is still in the tooth, and is as good as when it was put in. This illustrates one of the series of experiments that I have made, and I feel confident that a large percentage of success is to be obtained by securing a perfect occlusion of the filling. I do not think that this is possible with any other material which we have at our command today. I strongly advocate porcelain, and use a great deal of it, and believe that I can carve porcelain so as to produce occlusion—but not that absolute occlusion which I can obtain by means of the cast gold filling.

I said to Dr. Ottolengui a few days ago that I never would take up the commercial side of an operation again; but I wish to say that I believe, not as a matter of prestige with the patient, but

as a matter of business with the operator, that the cast gold filling or the cemented filling gives us an opportunity of doing more work in one day with better results for the patient than any other method that has come to us. I believe that this is so because of the fact that the cavity is prepared in most of these cases at one sitting, and the filling is inserted at the next. I am a strong advocate of the impression method, rather than the direct method; but whether it be the impression or the direct method that is applied, I believe that more operations can be carried to a successful issue at the end of one month by the cemented filling method than by any other method that we have. That, of course, is the commercial side, yet, while we benefit by it, the patients likewise are being benefited.

Personally, I believe the cast filling has revolutionized dentistry. It has put us on a plane that will bring us higher than anything we have ever had, without implying any depreciation of the value of gold foil. To me it seems just as absurd to stick to gold foil for contour fillings today as it would be to stand up for an old-fashioned horse-car against the present electric car as a means of conveyance.

The cast filling in my opinion marks the dawn of a new era in our profession, which will raise our reputation for skill as well as enhance our financial profits.

The PRESIDENT. What is your opinion on sterilization?

Dr. VAN WOERT. I believe that all cavities should be sterilized, regardless of whether any portion of unhealthy tissue is present or not, although, of course, none should be left in knowingly. Of course, as Dr. Ottolengui has stated, that is not always possible to define. A number of years ago I began applying alcohol, and I have used alcohol and eucalyptus ever since, and I am using it now in all fillings.

Dr. ASH. I agree so heartily with the essayist that there is nothing to which I could take exception, or to which I could add. I believe that the gold inlay is a rational form of preserving teeth, and that more teeth can well be filled by

incompetent men with the gold inlay, than with foil. Dr. Rhein, being a fine operator, laughs at this, but there are lots of men practicing dentistry, as we all know, who are not expert operators by any means, and that fact is not only recognized by the men into whose hands those fillings come later, but by the incompetents themselves. I have had men tell me that they wished they could put in gold fillings as well as Dr. Rhein, and it is very evident to me that there are many men who cannot put in good foil fillings, in spite of the fact that they spend many years in trying to learn it. Those men can make for their patients a good serviceable filling with the gold inlay, which they cannot do with gold foil. If a man be a capable foil operator, he can undoubtedly make a good gold inlay, and a point which appeals to me strongly is this: Given the same degree of skill in the manipulation of foil as in that of gold in the form of inlays, I believe that the patient receives a greater benefit by having an inlay inserted in a large cavity than by having a foil filling inserted, because to my mind the inlay will preserve the teeth at least equally well, with a minimum amount of tax on the patient, both as to time and strain.

I prepared two cavities in adjoining molars in one mouth yesterday, which it would have taken the best operators whom I have seen at least one and a half to two hours each to fill with foil. Both cavities were prepared, the impressions taken, and temporary fillings put in, in perhaps one and a quarter hours. Today one-half or three-quarters of an hour was spent in setting and finishing the fillings and dismissing the patient. All that was done in two hours, while a gold operation, even in very expert hands and with very much labor, could not have been done in less than four hours. Therefore, from the standpoint of the patient, I believe the gold inlay to be a rational form of preserving teeth.

Dr. HECKARD. Nearly everything has been said, but I do not think that occlusion has been accentuated quite enough. Much orthodontia work would

be unnecessary if badly broken down molars in children were restored to normal occlusion by the gold inlay, thereby *retaining* normal occlusion instead of losing it.

I should remove an inlay in order to treat a putrescent pulp-canal. The canals diverge at times, and I cut away until I can use the direct drill method, though some may use a curved broach. But this is outside of the scope of this paper, which I think is one of the best on this subject which I have listened to since the cast gold inlay methods have been brought out, not excepting Dr. Taggart's remarks.

Dr. HUTCHINSON. I have been greatly interested in this method of tooth-restoration. It appeals to me from the rational standpoint, and, as Dr. Ottolengui has said, it has revolutionized the practice of dentistry.

One point which he did not dwell on at sufficient length is the radical difference between the most perfect foil filling that could be made by the most successful operator in existence and even an imperfect gold inlay. In the cemented inlay we have a physical union, an adhesion between the filling and the tooth, which will exclude the bacteria. If decalcified broken-down enamel permits the entrance of the bacteria, will not the joint between a perfect foil filling and the enamel margins permit of recurrent decay under the influence of the oral secretions? With a cemented inlay, the cavity is hermetically sealed. Between these two kinds of fillings the same difference exists as between a bottle containing a fermentable fluid which is corked with a mechanical stopper, and one which is sealed by a paraffin or any other form of hermetic seal.

For that reason I think the gold inlay to be the most desirable form of tooth-restoration imaginable.

Dr. GILLETT. I am so much in accord with Dr. Ottolengui's remarks that I need say but little. I would emphasize one of the virtues that I prize in the gold inlay, which was not mentioned—the possibility of readily obtaining a filling which will not yield under stress.

I think it is to be expected that a gold inlay will stand more stress than the foil filling of equal size without unseating itself.

I have been pleased with Dr. Ottolengui's adherence to one of the train of thoughts expressed in Dr. Johnson's recent paper concerning rationalism in dental practice. His argument has been a consistent one in favor of the greatest good for the patient. He is basing his arguments on the fact that the professional man is bound to make his client's interest his own. We hear men advocating the gold inlay because they can make more inlays than foil fillings in one day, because they can keep so many assistants busy in their laboratory, because they find the process an easy one, and because they can turn all these advantages into dollars, all the while completely forgetting, or at least failing to mention, the chief point at issue—the patients' best interests.

Dr. RHEIN. I want to emphasize what I have to say by my hearty assent to the statement made by Dr. Gillett in regard to the prime consideration that a professional man should have for the welfare of his patient. Whatever the operation may be, there should be but one consideration—the permanent welfare of the patient. While discussing various technical topics I have, in taking this position, frequently met with the criticism that such an attitude was ideal and not practical dentistry. It has therefore given me great pleasure to hear the manner in which Dr. Gillett has expressed this point, for if practical dentistry is inconsistent with the real welfare of the patient, then the man who practices that kind of dentistry should have the stigma placed upon him that Dr. Gillett has so aptly suggested.

I can say with most of the speakers that I am in very hearty sympathy with much that has been said this evening, but there are two different phases to every question. There are a number of points that have been entirely overlooked in the subject under consideration. In the first place, one question of the practical side of the inlay has not come up at

all; that is, in what manner shall this inlay be inserted? in what condition shall it be inserted?

I have seen many cast inlays inserted in the mouth and finished to the margins of the tooth. It is inconsistent with my idea of a properly fitting inlay that any finishing should be done after the inlay has been cemented into place. I believe that the sort of inlay which has been idealized this evening should fit accurately before it is cemented into the tooth in order to meet the ideal requirements claimed for it.

If such an inlay is placed in the cavity and is found to be in good condition, the time saved for the patient in proportion to that required for a hammered gold filling presents an equation that we should consider rather than the equation that has been presented to us; for we have not been told how many inlays are made and discarded, by conscientious men, for other inlays, until the work answers the highest requirement.

I am a thorough believer in the rational use of the inlay, and the only question at issue in this matter is what the "rational use of the inlay" consists of, and of course that question cannot be decided academically for all by one of us. We all come to a decision according to our own individual standards and our own capability.

In a discussion on the technique of gold fillings before this society in which I took part a few years ago, I made a very strong plea in opposition to the method of inserting gold fillings, as advocated at that time by Dr. Johnson, by the method so generally followed by the men in the northwest, because it failed to give a filling of sufficiently high specific gravity. To start with, I object to the term gold foil filling if it is used in reference to a hammered gold filling, because I think the day has long since passed when gold foil should be hammered into a tooth. Gold foil is practically a back number, an antiquated article, when it comes to putting in a gold filling. It is inferior to rolled gold used for the same purpose, and there is a very great distinction between these

two articles to start with. This one fact should be taken into consideration.

Before Dr. Taggart presented to us his method of making a cast inlay, I had for years been inserting inlays made precisely like a filling that would be hammered into the mouth. When Dr. Taggart made his first visit to this society, I showed him some of these inlays that were ready to go into the mouth, and he had no criticism to make as regards their specific gravity and density in comparison with the cast inlay he was then advocating. I simply bring this up because there is such a wide divergence of view as to what a hammered gold filling is.

Moreover, how is a hammered gold filling inserted? There are all manners and ways of inserting hammered gold fillings, and that is where the individual comes into consideration. A hammered gold filling that has a cemented surface around the entire periphery of the tooth, except at the enamel margin, has every advantage of the cemented filling, but it has the great additional advantage that you can finish the enamel margin with a joint that absolutely hermetically seals it without any dissolving material interfering with that joint. It is at that very peripheral point of the enamel margin—as even the warmest advocate of any form of cemented inlay must admit—that is found the one weak point in the cemented inlay.

I am not saying this to detract from the rational use of the inlay, because I use them every day—rationally from my standpoint; but I wish to bring out the point that a hammered gold filling made in that way, if it is done perfectly and if the operation is carried through without a flaw, is bound to be infinitely superior to the cemented inlay as far as permanence goes, notwithstanding Dr. Hutchinson's eloquent remarks to the contrary. I insert these fillings, and I insert inlays, and I believe that a man who claims that he has never inserted an inlay is not the proper person to make so broad a contrary statement as did Dr. Hutchinson.

I wish to say further that I thoroughly agree that if a cavity is large, the axiom

presented by the essayist is correct—the larger the cavity to be filled, the more the use of the cemented inlay is indicated in the interest of the patient. But here again the operator's individuality comes in, as to what he considers a large or a small filling, and the question arises as to which of the two is the easier method.

In my own practice, in the class of cavities the essayist speaks of, where inlays are most called for, viz, from the bicuspid posteriorly, we generally meet with compound approximal and occlusal cavities adjoining each other. In most of these cases I find it far easier to insert a hammered filling in one of these teeth, while I have taken an impression and made a cast inlay for the other, for this reason: With the space at my command, when I have both of these teeth prepared it is a very simple matter to insert a flawless gold filling with a specific gravity equal to that of the gold inlay for all practical purposes, no matter whether pure gold or gold and platinum is used. Then, when it comes to placing a hammered filling in the adjoining tooth, I admit that the possibility of defects, be they ever so minute, exist to such a degree that there is the ideal place for the cast inlay, just as I believe that if there is only one filling to be inserted in such a position, the cast inlay is to be preferred, because it makes no difference how minute your defect may be, your filling, though beautiful all over, is no better as a whole than the minutest defect that may exist in it.

There is another point that has been brought up and very justly emphasized by Dr. Johnson, the real question of the durability of the inlay. The effect of the cemented joint cannot be determined in two or three or even in the first ten years, in my opinion, and this going to extremes in the laudation of the cast inlay is very apt to deter the young dentist from protecting himself in the technique of inserting the most perfect form of hammered gold fillings, a condition that is very much to be decried and liable to be very injurious to us as a profession in the future. For that reason alone we should be chary about going to the ex-

treme at the present time as to the usefulness of the cast inlay.

There is one thing the essayist brought out that I want to take exception to, and that is his description of the hollow inlay and its usefulness in certain cases. This illustrates one of the great advantages of the hammered gold filling over the cast gold filling or inlay. It is strange that in discussing this matter any advantage that the hammered gold filling has over the cast inlay seems to have been overlooked by all the speakers.

Anyone who has made as many inlays as has Dr. Ottolengui must recognize the necessity of a great deal more cutting away of tooth-structure, irrespective of cutting on the principle of prevention of recurrence of caries. The very preparation involved demands a more extensive cutting of the interior of the cavity, if the dentin is in a healthy condition, than is necessary in putting in a hammered gold filling. This is one point in favor of the hammered gold filling that should not be overlooked in a just discussion of this subject; and in this same connection, when the essayist speaks of his hollow gold inlay, applying it to a surface where the condition of the pulp is questionable, I want to enter a protest against the insertion of a filling of any kind in a tooth left in that condition. There are worse things that can happen to a tooth than the death of the pulp and a dental abscess. There are diseases that take place in the dental pulp that we have not begun to know anything about at the present day. This is one of the future exploits of scientific dentistry that will raise it to a place never attained before, *i.e.* the differentiation of the different diseases that attack the dental pulp and of the effects which such diseased pulps have upon the nervous organization of the entire body. I have made some studies on this subject for a great many years, and I realize how little I know of it, and what an immense field this is as a whole. It is for this reason that I say the possibility of damage done to the system by a diseased pulp has not begun to be appreciated by the dental profession, and when a tooth presents

such a condition the pulp should not be left in.

In making that statement I wish to say further that I do not take the pulps out of all the teeth that have to be filled or to be treated. As a gentleman said to me some time ago, it is this discrimination which each individual must exercise for himself, but, if there is a diseased area of tooth-structure that will expose the pulp, the essayist is undoubtedly correct in demanding that such a pulp should be removed; but he stopped a little short when he said, "if there is a questionable case." There cannot be any questionable case at such close quarters, in my opinion, after I have examined many pulps under the microscope.

I approve of the idea of the operator trying to make the dentin as aseptic as possible previously to the insertion of any filling. While a number of remedies have been recommended, I know of no better and simpler therapeutic remedy than a ten per cent. solution of formaldehyd for this purpose. It has a double advantage in most of these cavities from a practical standpoint. Its coagulating effect on the dentin makes it a magnificent obtundent to start with, and its aseptic properties are second to none of those therapeutic agents that have been suggested. If I cared to leave affected or infected dentin in a tooth such as has been described by other men, I should resort to electrolysis for this purpose, it being the only sure method of producing a result of this kind.

I do not wish the essayist to think that I am opposing his views in the main, but I want to make a strong plea for the continuance of the rational use of the hammered gold filling, as well as for the use of the cast inlay.

Dr. DAILEY. There is hardly anything to discuss. I agree with the essayist, and I wish to call your attention to the fact that he has quoted Black all through, so that he has a scientific authority for his paper.

Dr. OTTOLENGUI (closing the discussion). Dr. Van Woert started by complaining that I had not used the word "occlusion." I did not use it because I

was afraid someone might think that I was posing as an orthodontist, but I used it by inference in the very forefront of the paper, when I pointed out that the filling of cavities has come to mean now the absolute restoration of the shape of the teeth, for in doing that you restore not only the contact point but also the occlusion.

Dr. Heckard paid me a very pretty compliment, and he made a very logical statement when he said that he would remove an inlay completely when wishing to enter a putrescent pulp. The method which I described I recommend for two conditions: first, where the pulp dies under a filling; and second, where you have treated the putrescent pulp in advance.

In regard to the rational use of the inlay I also wish to say that the one extension which I think is rational in the making of an inlay is to start by removing all old fillings and replacing with one instead of the four or five fillings which you may find. If you do that—if, for instance, you make an inlay which occupies practically all of the disto-approximal surface, practically all of the mesio-approximal surface, passes through the morsal surface, and extends down into the buccal groove, so that one filling completely protects all of the surfaces of the tooth which are usually attacked by caries—I do not think Dr. Heckard would remove that filling from a tooth with a dead pulp, because I do not think he could. That is one of the wonders of the gold inlay, and one of its great advantages over any kind of hammered filling—that you are not afraid of cutting away tooth-structure. Cutting away hardly renders the work of restoration more difficult, but when you know that every line and every millimeter cut away means ten or fifteen or twenty minutes more hammering for the patient, you do hesitate to cut as freely as you would otherwise.

I thought I had out-radicaled Dr. Rhein when I spoke of taking out pulps, and I was a little surprised to find him disagree with me, and say that I do not take out enough pulps. Dr. Rhein, I

think, is laboring under a misapprehension. He speaks about there being no possibility of doubt or chance of question about whether or not a pulp may be infected; that it should be removed if closely approached. I have seen a number of cases—one I have especially in mind, which led me to the use of the easily perforated gold inlay—and from these cases I know that pulps may die even a short time after a filling has been inserted, even though they had not been nearly approached during the removal of the carious portions.

In one case in my practice where I put in such an inlay as I described, covering three surfaces of a tooth, the tooth gave so much thermal trouble afterward that I concluded that I had made a mistake in leaving the pulp in, and I was unwilling to wait for the death of that pulp, which I thought was certain. I drilled through the inlay and reached good solid tooth-structure, and after I had exposed quite a large surface in order to obtain good access, I had a long distance to drill before I penetrated the pulp-chamber. At the time of filling, I do not think even Dr. Rhein would have taken that pulp out. I knew that when the pulp gave trouble it would die, and for that reason I entered it, and for the same reason I now make a thin place in such inlays. I filled that inlay with another inlay. I had to enlarge the opening sufficiently to get at both root-canals, and made another inlay all borders of which touch gold, no part touching enamel, the inlay resembling a stopper in a bottle.

Dr. Gillett made a suggestion with which I beg to differ somewhat. He said the gold inlay would be a little more durable than even the best gold filling, because it would be less likely to flow. It is because I did not find that to be true that I am using alloyed gold. The inlays which I put in, in earlier days, following Dr. Taggart's advice of using pure gold, were not entirely satisfactory. Of course, you must not compare an inlay in Mrs. Jones' mouth with a gold filling in Mrs. Smith's mouth, but I had an opportunity to see a case which I

think permitted of a fair comparison. I put in a large gold contour filling about three years ago, prior to the casting process, in a lower second molar, and a year ago, or just after the meeting at which Dr. Taggart showed us his process, I inserted a gold inlay for that same patient in the next tooth, the two fillings rubbing shoulders, so to speak. Those two, one an inlay, the other a foil filling, are undoubtedly in the same environment and are undergoing the same stress. The gold inlay has been in the mouth only half the time the gold filling has, and it has no better surface. Both surfaces are slightly roughened by attrition. I find that by using an alloyed gold I can secure a surface that will not become roughened. I have been using the seven per cent. platinized gold recommended by Dr. Rhein, but I am not entirely satisfied with it. It is excellent for some cases, but I think I should get better results with three per cent. or four per cent. platinum alloy.

Dr. Rhein made a differentiation between the rolled gold and the gold foil filling. I admit that there is a difference, and yet while Dr. Rhein is technically right, he is splitting hairs, because No. 30 foil is called gold foil. In regard to gold foil fillings or hammered fillings, I should be willing to revise my paper and include both kinds.

After telling us all that, Dr. Rhein points out that in his practice he gets the cement all under his filling, almost up to the margin, and then he tells us that he has made a gold foil filling in a model of the cavity, which he afterward cemented in. I can make this differentiation there: That is not a gold foil filling nor a rolled gold filling; it is a rolled gold inlay, a hand-made cemented filling, instead of a cast filling. These fillings are not what you might call the rolled gold fillings of commerce. They are only made at Dr. Rhein's office, or at two or three other places, by a few very skilful men.

Personally I have done more cutting since I have been using inlays, and in that cutting I have seen infected areas disclosed that I scarcely suspected before.

This only bids me mention what I see so clearly stated in Dr. Black's new book, namely, that after caries has passed through the enamel and has entered the dentin, it not only proceeds into the dentin in the direction of the pulp, but there is also a backward decay of the enamel, a reverse action, an attack upon the enamel from the dentinal side. I believe that this explains the blue lines that appear around otherwise perfect fillings.

The great advantage of the gold inlay over every other method is that you can cut away tooth-structure without complicating the work of restoration.

The PRESIDENT. Dr. Ottolengui, on behalf of this society, and personally, I thank you for this splendid paper.

Adjourned.

FREDERICK C. KEMPLE, D.D.S.,
Editor New York Odont. Soc.

RHODE ISLAND DENTAL HYGIENE CONFERENCE.

Held in Providence, R. I., March 31 to April 3, 1909.

UNDER the auspices of the Rhode Island Dental Society, the Rhode Island State Board of Health, and the Rhode Island Dental Hygiene Council a most successful conference was held in Providence, R. I., from March 31 to April 3, 1909.

From an educational standpoint the conference was a pronounced success, and a permanent organization which will have for its purpose the spreading of education in the principles and practice of dental hygiene is one of the beneficial results produced. Men prominent in the hygienic, educational, and civic affairs of Rhode Island took an active interest in the work of the conference. Hon. Henry Fletcher, mayor of the city of Providence, spoke at one of the meetings, and advocated free dental clinics for the treatment of the poor, declaring that any movement for the better care of the mouths and teeth of the citizens of the community was "a move in the right direction." Walter H. Small, superintendent of schools of Providence, and Judge Frederick Rueckert, president of the school committee, were enthusiastic in their praise of the work that is being accomplished. Gardner F. Swarts, M.D.,

secretary of the Rhode Island State Board of Health, was prominently identified with the active work of the conference, and to his co-operation with the Hygienic Council, of which Dr. Albert L. Midgeley is chairman, its success is in a great measure due.

A dental exhibit, consisting of charts, posters, photographs, and models, was open throughout the conference, and proved to be a source of much interest to those who visited the Providence Public Library, in which building the conference was held.

During the week preceding the conference, the newspapers gave much publicity to the results of a dental examination which had been made by James C. Colton, D.D.S., of Providence, in the public schools of the city. Dr. Colton's examination was the first of its kind that had been made in the city, and much interest was created when Superintendent of Schools Walter H. Small presented the report to the school committee and recommended that dental inspection be made a part of the medical inspection of the schools. In view of this recommendation from the superintendent of schools and of Mayor Fletcher's advocacy of pub-

lic clinics for the poor, the Dental Hygienic Council of Rhode Island have cause to feel that their conference was a decided success.

OPENING MEETING—*March 31st.*

The opening meeting, held on March 31st in the lecture room of the Providence Public Library, was presided over by Dr. Arthur M. Potter, president of the Rhode Island Dental Society. On opening the meeting, Dr. Potter stated briefly the purpose of the conference, dwelling upon the relation of dental cleanliness to perfect health.

Dr. Potter next introduced GARDNER F. SWARTS, M.D., secretary of the State Board of Health of Rhode Island, who spoke on "The Duty of Health Boards in the Education of the People in Personal Hygiene," demanding that action should be taken. He said: If it is true that only four out of every hundred school children in this city have good teeth, then it is time to do something. It is the duty of the state to conserve as much as possible the health of its people, and this is done through the boards of health. We, the members of these boards, advise the people. A good sound body depends to a certain extent upon good sound teeth. We hope to educate everyone, especially the school children, as to the necessity that they should clean their teeth and take as good care of them as they do of any other portion of the body.

Dr. Swarts spoke of the relationship between tuberculosis and carious teeth, pointing out that cavities in which decayed matter is allowed to accumulate are veritable breeding-places for the germs of contagious diseases.

Dr. Potter next introduced WILLIAM W. MARVEL, D.M.D., of Fall River, Mass., who read a paper on "Dental Hygiene," of which the following is an extract:

ORAL HYGIENE.

Providence is certainly to be congratulated on her timely activity in the crusade for a better condition of the mouth and surrounding tissues. Rhode Island

is the second state in the United States to establish a formal organization and start the ball moving in a systematic way. At the outset it must be remembered that this is a social movement purely, not intended to advertise dentists or dentistry, but representing an altruistic effort on the part of mothers, teachers, and social workers to make clear to the children and to the public in general that the mouth and the teeth are most important to the welfare of the entire body.

A Boston physician has admirably expressed the proposition in the following words: "Good Health is dependent upon Good Nutrition. Good Nutrition is dependent upon Good Mastication. Good Mastication is dependent upon Good Teeth." Here are four links in the chain of good health, each one being necessary for the others. And furthermore, these are the *first* four links that must be reckoned with.

"The teeth are the keys which unlock the nutriment from the food." It is not popularly known that the loss of a molar tooth in either jaw partly disables the two opposing teeth. One of the tragedies of the day is the promiscuous extraction of teeth which with a little time and patience could be restored to their original value. Ask a miller how his meal would look if there were breaks in his mill-stone. He would repair these deficiencies immediately or his product would be unmarketable. He will tell you that the larger the stone the finer the meal. The same is true of our mouths. If we expect to provide food for the stomach in the proper condition for perfect digestion, we must have no gaps in our mill-stone, and we should retain the much abused third molar in order to make that stone as large as possible.

A word about how teeth decay: It is a fact that in places where food can find a lodging, disintegration is most likely to set in. If food is allowed to remain in the mouth for any length of time, putrefaction sets in, and an acid known as lactic acid attacks the hard enamel and causes it to soften. The door is then open for germs to invade the softer inner tissue, undermining slowly

but surely the whole tooth. When this has gone far enough the top caves in, and then we hear the cry, "Our teeth have gone to pieces all at once!" Teeth never go to pieces that way.

Then comes the critical stage and the most dangerous condition. The ragged hole in the tooth becomes a hotbed for the growth of all kinds of disease germs. Here we have warmth, darkness, moisture, and filth—conditions dear to the heart of the microbe. We cannot clean the microbes out, and so they are waiting for the time when our system is in a lowered state of resistance to set up tuberculosis, typhoid, or one of a host of other diseases known to us all.

The one thing which all of us must do is to teach our children, our families, everybody, to allow particles of food to remain only the shortest possible time between our teeth. This is the keynote to the whole situation; it should be our slogan. Our mouths are the portals of our digestive tract, and therefore it is of greater importance that they should be in a healthy and clean condition than our faces. Some people think that no dirt exists where it cannot be seen.

Clean the teeth often. If we have constantly in mind that the food must be removed from between the teeth we shall bring about a good result. Use silk floss waxed so as to "take hold." Use a good, pure, finely powdered dentifrice. A little cooking soda used several times a week will destroy any acid condition.

Let us go away feeling that there is such a thing as mouth decency. Let us give full instruction to our school children. Teachers, have a tooth-cleaning contest once in a while! This is a great movement and will spread over the country rapidly. It is certainly worth while, and it will succeed.

(Dr. Marvel showed blackboard diagrams illustrating the various points of his paper.)

At the close of this address, Dr. D. F. McCarthy of Providence explained to the audience the charts, etc., collected for the exhibit. Dr. McCarthy's previous experience with dental clinics and dis-

pensaries in Boston enabled him to illustrate most forcibly the ill-effects resulting from dental disease, and his interesting explanations of models and photographs found an attentive and enthusiastic audience.

SECOND MEETING—April 1st.

The second meeting, held on April 1st, was presided over by Frederick Rueckert, judge of the juvenile bench of the Sixth district court, and presiding justice of the same court.

In opening the meeting Judge RUECKERT, acting in the capacity of president of the Providence school committee, said: I can see no reason why the Board of Trade of this city should not be engaged in matching molars and incisors as well as in matching buttons [a practice adopted during the recent boom banquet in Providence]. It is just as important that the city of Providence should have a boom in health conditions as a boom in industry. If you neglect either, you suffer, but if you attend to a disease condition at the very start, there will be but little trouble. Neglect, however, means that you will have to pay much more in the end.

Judge Rueckert then referred to a visit paid him by Dr. Colton about three months before, when the suggestion was made by the visitor that a campaign should be started in the city in order to bring about better dental conditions among the children. Dr. Colton was invited to visit the juvenile branch of the Sixth district court the following day. He called and examined sixty-four boys, of whom only one was found to have no decayed teeth. It seemed then to me that there must exist some relationship between the presence of those boys in that court and their poor teeth, and it appears as if there were also a relationship between the backwardness of school children in their studies and poor teeth. This series of lectures is an attempt to bring these relations to the attention of the parents and of the children themselves, and it is hoped that the move-

ment begun will bring about an improvement in the existing conditions.

Rev. JOHN F. MURRAY of Providence, R. I., was then introduced as the first speaker of the evening. He spoke of "The Duty of the Clergy in the Matter of Hygiene," saying in part: It is impossible to preach hygiene from the pulpit, for people attend church not for the hygiene of the body, but of the soul. He paid a tribute to the schools as a medium of education not alone in the "three R's," but also in matters of health. The speaker expressed his opinion that general co-operation in the bringing about of a systematic method of education of school children in the practice of dental hygiene would be of great value, especially for the poorer classes.

Superintendent of Schools WALTER H. SMALL was next introduced, choosing for his subject "A Layman's View," as follows:

A LAYMAN'S VIEW.

I am here as a layman, not as an expert or as one replete with scientific knowledge. I just observe the trend of events. In this country, owing to a long succession of prosperity and a wealth of material resources there has been great prodigality. We are just awakening to the fact that waste must be eliminated, and that natural resources must be guarded. We are just discovering the value of forestry laws, and universities are educating foresters. Five times as much timber as grows is cut or wasted every year. It is only a small problem in arithmetic to show when the end will come. Wholesale timber waste gives us denuded hills; these affect the rivers; these affect mills and business.

It has been discovered in business that what used to be the waste products now pay the dividends. It is said in Chicago that everything about the slaughtered pig is now saved except the squeal. Pigs' blood gives us buttons; sawdust, glue, and hydraulic pressure give us household ornaments.

What is true of natural resources and business products is now becoming true

with reference to education. In former days anybody went to school, but the delinquent, the morally unfit, the feeble-minded, and the dullard were excluded or were gradually forced out. Now these are being educated in special schools to the fullest possible extent.

In the olden days of large families there was a large death-rate, a great waste of human life. Today, though families are smaller, a greater proportion are raised to manhood and womanhood; life-waste is eliminated. This elimination has been possible through the work of various societies focusing their energy along certain lines—as witness the Tuberculosis Society of this city.

In the old Spartan days, when a child was born it was examined by a state board who passed upon its physical fitness. If physically fit it grew up in the family until it attained a certain age, when the state took it under control, physically, morally, educationally. Those who did not pass the examination were allowed to die. This made the great power of the Spartan state. Today the rejected Spartan child would be reared to effective manhood or womanhood. In our great transition from country to city life there has been that great change of environment that needs forceful work in many directions to make that environment healthful and to eliminate not only waste of life but waste in economic value.

The economic value of the individual depends on ability; ability depends on vitality, and vitality depends on health. Hence the crusade for fresh air, better tenements, and purer air. The present conference is simply applying the elimination of waste to the schools. In the earlier days no thought was given to the fact that school time, school money, or school effort could be wasted through the physical inability in the pupil to make the most out of his school opportunity. At first, pupils found ill of contagious diseases or just recovering from them were not excluded from school. Then came laws and regulations excluding the more virulent diseases, and this has been extended so that those afflicted with skin diseases, pediculosis, or any

diseases that give off bad odors are excluded. Then came medical inspection and care for contagious diseases, adenoids, and eye, ear, and skin diseases. All this was instituted in order to eliminate waste and to render the time and effort spent in school more productive.

Is not the next step—the one taken by this conference—a natural one? If it is legitimate to care for the above-mentioned afflictions because they produce waste, is it not also logical to include the care of the teeth, which can cause more pain and more discomfort than almost any other single affliction? If health depends on digestion, and digestion on mastication, and mastication on teeth, is it not wise to see that the teeth are in as healthful a condition as possible, and that pupils be made aware of this fact through theory and through practice, so that out of it may come as complete an elimination of waste in the school as possible? This is the layman's thought.

In introducing the last speaker of the evening, Dr. JAMES C. COLTON, assistant dental surgeon to St. Joseph's Hospital, the chairman referred to a recent examination of school children in Providence. Dr. Colton then spoke on "The Dental Condition of Children in the Providence Public Schools," as follows:

DENTAL CONDITION OF CHILDREN IN THE PROVIDENCE PUBLIC SCHOOLS.

To us who are fortunate enough to be living at the present time there is presented an opportunity of enjoying an era which has rightly been called "the golden age of childhood," an era in which every opportunity for progress and success is being offered to the rising generation, and with truly American activity the rising generation is embracing these opportunities and fighting manfully for success, the goal of American ambition.

That the American youth is born to succeed is acknowledged throughout the civilized world. In this land of opportunity there is but one legitimate excuse for failure, and that excuse is ill-health. When we consider that the destiny of this nation will pass from those who are now

in control to those who are now the children of our schools, it becomes only too manifest that all possible effort should be made to prevent physical inadequacy. The laws of our city compel a child to attend school, and the same channel through which that law became operative is navigable for a law which will protect the health of the child while in attendance at school. Education does not consist simply in the acquisition of knowledge. The great idea underlying all instruction should be to fit and stimulate the pupil according to his individual ability. This, of course, requires teachers of intelligence and discernment, to whom their calling is not merely a routine business.

But it does not fall within the province of the dentist to sit in judgment upon the teaching force of our schools, and were we inclined to go beyond the limit of our province and hide behind the shield of privilege, I am sure that the teaching force of our city would command the highest indorsement. The majority of our teachers, the instructors of our schools, are women—unselfish earnest friends and spiritual mothers to the children under their care. The richest child in America can have no greater advantages for education than the poorest child in our public schools. The rich father may give a private teacher all the money he will, but he cannot give that teacher the inspiration that comes of teaching earnestly the people's children as the people's representatives.

In the schools of our city almost 30,000 fathers and mothers of the future are brought under the influence of directing minds lofty in their ideals, devoted and unselfish.

Realizing this, is there a man of any walk in life, rich or poor, educated or ignorant, who would, if he could, attempt to sit in judgment on our school system? No! The dental profession least of all assumes so unworthy a rôle. We do not criticize the methods employed, but when physical injury is likely to occur as a result of methods that are *not* employed, then and only then may we offer suggestions.

The medical profession through suggestion has done much for the health of our school children, and to their effort is due the almost complete elimination of diseases which in former days were commonly epidemic. One example which in itself will stand as a lasting monument of true, practical interest in the welfare of the child on the part of the school and health authorities of our city is the fresh-air school. The benefits of this institution are beyond measure, and through its health-giving privileges children who otherwise would occupy early graves will live to know the value of a liberal education and to reflect credit on the city which gives them health. Summer playgrounds and school baths are other factors in the crusade for health, and the patronage of these undertakings assures their success. Tonight the dental profession asks your co-operation in bringing to a successful termination an effort to educate the rising generation in the principles and practices of dental hygiene.

In no part of the human body is the practice of hygiene more important than in the mouth. It is hardly credible what a great number of diseases find their origin there, but let me enumerate a few of the most common sequences of an unhealthy oral condition:

Indigestion, caused by improper mastication or chewing of food, with its accompanying breaking down of the system.

Heart disease, tuberculosis, typhoid fever, scarlet fever, diphtheria, many diseases of the eye, ear, nose, and throat, and many so-called nervous diseases. I believe that the chief causes of nervous diseases in school children are defective teeth and abnormal oral conditions. No one can properly masticate with bad teeth, and a child who cannot properly prepare his food in the mouth is inducing abnormal conditions of the stomach, which retard physiological development and produce faulty metabolism; the result being that the child becomes anemic. Conditions will arise such as peculiar sensations in the head, vertigo, dyspepsia, chorea, insomnia, epilepsy, hysteria,

nervous prostration and not infrequently insanity.

Time will not permit me to enter in detail into the morbid far-reaching influence of an unhygienic condition of the mouth and teeth. My purpose is to convince you that there is a condition existing in the schools of our city which must be overcome if the health of the child is to be kept normal and a satisfactory standard of scholarship attained.

Recently it has been my privilege to examine over 1200 school children in Providence. An extensive report of this examination has already been given to the public and I shall not tax you with a lengthy recital of conditions as they were found in the several schools, but will briefly say, that of 1203 children examined, 1161, or 96.6 per cent. had decayed teeth and 557, or 46.3 per cent. had suffered from aching teeth within two weeks.

In Charles st. primary school, where I examined 150 children, 145 were found to have decayed teeth, and 98, practically two-thirds of those examined, had aching teeth. At Arnold st. primary school the condition was very similar. It undoubtedly occurs to you that these schools draw their pupils from a poor section of the city, and that the parents can hardly be expected to supply dental treatment to their children; but where does such argument fall, when in the Broad st. primary school only three of 122 had no decayed teeth, and 42, or 33 per cent. of those examined, had aching teeth? These figures are practically the same throughout the primary schools. In my judgment much of this suffering of childhood could be overcome, were the parents educated to the necessity of dental care.

The grammar and high schools showed no great difference in the general dental condition of their pupils other than a natural decrease in the number of decayed and aching deciduous teeth.

At Lexington ave. school, 105 children were examined and 101 were found to have decayed teeth, and 33 had suffered the pain of toothache within two weeks. Point, Candace, and Broad st. schools showed no variation in the general con-

dition. In the technical high school, where 100 young men were examined, 96 were found to have decayed teeth, and 22 claimed to have suffered with toothache within two weeks.

These facts seem surprising, and may appear to be without apparent cause, but the answers given by the children as to the use of tooth-brushes explain in a most satisfactory manner this deplorable dental condition. Of the 1203 examined, only 19.2 per cent. used a tooth-brush at least once a day; 37.7 per cent. used a brush not less than once a week but not as often as once a day, and 43.1 per cent. never used a tooth-brush.

In the face of such flagrant lack of dental care, it is not surprising that over 96 of the children examined have decayed teeth.

Believing, as I have already said, that nervous diseases and lowered vitality (due to abnormal oral conditions) contribute to a low standard of scholarship, I visited the ungraded rooms at the Benefit st. and the Chalkstone ave. primary schools and there examined 39 of America's young hopefuls. I found that every child had decayed teeth ranging in number from one to ten; 23 had aching teeth; 19 had been disturbed while sleeping by aching teeth within two weeks, and 14 could not eat without pain from carious teeth.

I am satisfied that these figures support my contention.

While making these examinations many conditions worthy of mention were met with—as, for example, when a child was asked if he ever had a toothache, I received not infrequently the answer, "Yes, sir, I have one now," or in other cases the answer, "Yes, sir, all last night." Not a few children said their teeth ached all the time. The condition already referred to, of 98 of 150 children at Charles st. school giving a history of suffering from toothache, is worthy of note. The principal of that school said that a bottle of oil of cloves was kept on hand in the school, because she had found that the parents did not know what to do for the children when they were sent home because of aching

teeth. Many of you can recall with terror the suffering which you may have realized from aching teeth, and to some extent you can sympathize with these little victims, but the full extent of their suffering can only be known by those who examine their mouths. Consider pale, wan, ill-nourished boys and girls, whose mouths contain carious molars in which exposed pulp tissue, receiving constant shock, has become so inflamed as to respond with excruciating pain to the slightest pressure! How can a child with such a condition of his mouth and teeth be other than an apparent mental defective?

One strong example of the effect of an abnormal dental condition on the progress of the child was that which was called to my attention by a teacher in one of the grammar schools. A girl, age sixteen, had been dismissed from one school and was allowed to remain in her present school only through forbearance on the part of the teacher. I examined her and found that she had not only decayed teeth in numbers, but also had a palatal condition which severely embarrassed speech and made her more or less of a butt for the other children. This child told me that her teeth ached very often, and the condition of her mouth presented much evidence of suffering. I believe that this child could be brought up to her rightful standard of scholarship if her palatal condition were corrected and her aching teeth relieved.

The stories of the use of the tooth-brush would prove entertaining in many instances, were the humor not lost in the fearful effect of disease transmission in families where all members are using a single tooth-brush. Questions as to whose brush was used were not asked, as a general rule, but among those from whom such inquiry was made, I found boys and girls telling with pride of using father's, mother's, sister's, and brother's tooth-brushes without even a thought of the danger of infection. Another fact brought to light through this examination is that even in well-regulated homes a common receptacle is used for the individual tooth-brushes; each member has

his own brush, and when he uses it he runs cold water on it, perhaps, and places it back in the receptacle with the others, contamination resulting from direct contact.

It is most surprising to meet children who are the very quintessence of cleanliness as far as dresses and pink hair-ribbons are concerned, but whose mouths are veritable culture tubes for disease germs; the parents of these children never give the matter a thought, and not until the pangs of toothache disturb the peace of their child do they realize that a disease condition exists. If the parent can afford dental treatment the child is given relief, but if the parents are poor the child is in many instances allowed to suffer without even sympathy.

The suffering of childhood must and does appeal to our humane instincts, but the actual pain realized is of least concern to all except the little sufferer. He alone bears the pain, but all his associates must share in the morbid pathological condition which brings about his suffering. Is it for the welfare of the child that we sit idly by and maintain an inhuman silence while the ravages of disease which finds its inception in an unhygienic condition of the mouth and teeth manifest themselves, not alone in the unsuccessful effort of the poor and uncared-for child, but also result in disease transmission manifesting itself in the mind and body of the child whose home life perhaps furnishes luxury? The school child whose mouth is unclean from decomposing food and stagnant septic salivary matter, due to indigestion, generally exhibits pus, exudations from irritated and inflamed gum margins, gaseous emanations from decaying teeth, putrescent pulp tissue and chemical poisons. With every spray from such a mouth in coughing, sneezing, or even talking or reading, the air becomes laden with microbes which are inhaled by others. Does the dental profession go beyond the limit of its province when it suggests that it is unjust to deprive the children of our schools of oral hygienic education, and as a result to continue to pay yearly toll to the death-rate from tuberculosis and

other transmissible diseases to which the children of our schools are now subjected by forced predisposition?

The problem of overcoming this condition is enormous, and if 96.4 per cent. of the entire 28,000 school children of Providence have decayed teeth, which I believe to be the case, then there are over 27,000 public school children in need of immediate attention; and if 46.3 per cent. of the 28,000 school children are suffering from toothache, there are 13,000 whose nerve condition is abnormal and who cannot reasonably be expected to attain a satisfactory standard of scholarship; and if, again, of the 28,000 only 19.2 per cent. use a tooth-brush regularly, there are 27,450 to be educated!—and the dental profession in their effort ask the support of the parents, the teachers, the newspaper editors, the philanthropists, and the public in general.

In the schools much can be done. The teacher has the advantage of reaching the child at a time when youth is plastic and easily molded for the future. For this reason we ask that the teacher give some time each week to the education of those under her care. Teach them first of all how to brush their teeth, then insist upon having it done. Educate them in the value of dental cleanliness, not alone from the standpoint of health, but also from a social standpoint. Educate them until they learn to regard clean, well-cared for teeth as an outward expression of an inner substance which denotes consideration for their teachers and fellow classmates. The young minds are susceptible and will readily appreciate the value of clean, well-cared-for teeth. Dr. Richard Grady of Annapolis suggests giving the dental condition of children recognition in their quarterly report, and thereby offering indirect reward to child and parent.

A schoolboy cannot be induced to brush his teeth by simply telling him that in five years they will ache if he doesn't brush them, or that tuberculosis may follow as a result of unclean teeth. What does the average schoolboy care about tuberculosis? He has never given a moment's thought to the final parting from

his friends; and why should he have done so? He lives only in the present and for enjoyment alone. Educate him to know that his ability to make a home run or to pitch his ball nine to victory depends upon his health, and that sound teeth are an aid to health, and while he may doubt it, he will be so unwilling to risk his athletic reputation that he will accept suggestions, and in doing so will, we hope, acquire the habit.

Much of life's happiness depends upon the health of the individual, and health depends in a great measure upon the teeth. The drooping head, the pale face, dull, sunken eyes, flat chest and rounded shoulders, emaciated limbs and general lack of good physical, mental, and moral tone may be traced, directly or indirectly, to disease conditions of the mouth and teeth. Co-operate with us, ladies and gentlemen, in this endeavor, and much can be done to preserve the health, increase the happiness, and assure the success of those who are now living in "the golden age of childhood!"

THIRD MEETING—*April 2d.*

The third meeting, held on April 2d, was called to order by J. Henry Manning, D.M.D., vice-president of the Rhode Island Dental Society.

Dr. MANNING, in opening the meeting, said: Ladies and gentlemen,—No doubt you have all been made acquainted through the columns of the daily press with the fact that we have been carrying on an exhibition and a series of lectures here. Perhaps it would not be amiss, however, to review for a moment the history of this movement for the benefit of those who are unfamiliar with our objects. Our dental colleges, societies, and journals have been preaching oral hygiene for years, but they did not reach the public directly. Realizing this fact, the dental profession of Massachusetts organized a Dental Hygiene Council which has done exemplary work along these lines, and has met with remarkable success in that this state is bringing to the public's notice the absolute necessity

for caring for the oral cavity of the individual. We citizens of Rhode Island feel that similar work would accomplish similar results in our state. The Rhode Island State Board of Health, in conjunction with the Rhode Island Dental Society and the Rhode Island Dental Hygiene Council, have undertaken to preach the doctrine of cleanliness of the mouth and adjacent tissues, and so far with gratifying results.

The meeting of tonight is the third of a series; others are to be held on Saturday afternoon and evening. We are not here to advertise dentistry or any individual group of dentists; we aim to instruct the public in the absolute necessity of keeping the gateway to the body in as nearly a healthy condition as possible. If we succeed, our efforts will not have been for naught.

I cannot speak too highly of the committee who have had charge of the arrangement of these meetings, as they have given of their time unsparingly and have secured able speakers to address you on the subject of dental education. I am pleased indeed to preside over this meeting tonight, and to introduce to you as the first speaker an educator from Massachusetts, Dr. Wm. H. Potter, professor of operative dentistry in Harvard University.

Dr. WM. H. POTTER then read a paper on "The Teeth of School Children, How Related to Health and Physical Development."

WM. R. WOODBURY, M.D., of Boston, Mass., spoke on "Dental Hygiene: Its Real Significance."

SPECIAL MEETING FOR SCHOOL CHILDREN—*April 3d.*

On Saturday afternoon, April 3d, a special meeting, presided over by Dr. Albert L. Midgeley of Harvard University Dental School, was arranged for school children. So great was the interest aroused in the schools of Providence that school children in numbers so great as to make access to the Library building most difficult gathered in an effort to

gain some knowledge of the proper methods for caring for the teeth. Three separate lectures and stereopticon demonstrations were given by Dr. D. F. McCarthy, after which the school children were dismissed to make room for parents and other adults.

Dr. Albert L. Midgeley opened the session. Miss Ellen LeGarde, instructor in physical culture in the Providence public schools, was the principal speaker, choosing as her subject, "Health as a Factor in the Progress of the Child."

Miss LEGARDE said, in part: The compulsory laws which compel all children to attend school also subject them to all kinds of contact, and in the modern study of children it was soon observed that contact not always resulted in good. We are living in an era that pays attention to health. The value of health as a factor in the progress and success so dear to the American heart is rightly acknowledged. Medical inspection of schools is a movement national in scope. England, France, Belgium, Sweden, Switzerland, Bulgaria, Japan, the Argentine Republic, and Germany have well-defined governmental methods of medical inspection. The United States are far behind other countries in this respect, for there are only seventy cities outside of Massachusetts that have a system of medical inspection, Massachusetts having a compulsory medical inspection law; New Jersey has a permissive one. Vermont has a law requiring the annual testing of vision and hearing of school children; Connecticut has a law providing for similar tests triennially.

I dislike to be an alarmist, but the healthy, the well-nourished child exists only in spots. Our children suffer from being underfed or fed with poorly prepared, ready-made food. In a school in one of the well-to-do sections of this city there are two girls, one eight and the other twelve years of age, who are the only children in the school who show evidence of good, nourishing food. The better class of Jewish children, whose parents have acquired some means, look ruddy, round, and rosy. The majority

of our children are neurotic, pale, underfed. They need more than we are now doing for them. The community needs an awakening to the fact that nearly all our children are under-weight and underfed. What is the first thing in which a family retrenches when economy, fancied or real, must be practiced? The table—and soon enough the children show it.

The Moseley commission, visiting from Great Britain, said to me: "Your children are better clothed than ours—every one has shoes and good gowns; but they are very peaked, don't you know, and are they not very small for their ages?"

Any new move for better care of the body must begin with the children, for they carry home the message of faith in good works. The possibility of taking children at a time when soul and body are still plastic and placing them on a level higher than that hitherto occupied by them is one of the aims our American schools are accomplishing. To paraphrase a well-known American expression, Give me the children, and I will make a state where health and progress will make a Utopia.

Miss MARY S. GARDNER, superintendent of the Providence District Nursing Association, spoke on "Cleanliness and Health with Special Reference to the Care of the Mouth and Teeth." She laid much emphasis on the necessity of each child having his own tooth-brush and using it.

After a brief talk on the value of cleanliness, the children were given an opportunity to answer Miss Gardner's questions, the purpose being to ascertain whether or not they had followed the trend of thought expressed in them. A surprising familiarity with the rules of health was shown by many children, especially among those of foreign-born parentage.

Mr. JAMES F. MINNICK, general manager of the Providence Society of Organized Charities, spoke briefly of the crying need for dental clinics among the poor.

CLOSING MEETING—*April 3d.*

The closing meeting of the conference was in charge of James E. Heap, D.D.S., of Providence, and proved to be most successful. Mr. George F. Weston, principal of the Technical High School, in Providence, presided. He spoke of the surprise which he experienced when the report of the dental condition of the boys in his school was read to him, and he assured the Hygiene Council that he would assist in every way to better that condition.

Mr. Weston first introduced Dr. D. F. MCCARTHY, who gave a most interesting stereopticon lecture on "The Value of Dental Care." Dr. McCarthy had prepared some very valuable slides for this occasion, and held the interest of the audience throughout the lecture, showing pictures of teeth in various stages of decay. A series of orthodontia cases also proved of interest.

Following Dr. McCarthy's lecture the chairman introduced HELEN M. PUTNAM, M.D., of Providence, who spoke on "Steps Taken and Steps To Be Taken in the Crusade for Health."

Following Dr. Putnam's paper, Dr. JAS. E. HEAP spoke on the work which is being done by the dental profession, and assured the audience that this conference was not an advertising medium for any particular dentist or group of dentists, but an undertaking entirely altruistic in its purpose. Dr. Heap commented on the large number of diseases arising from unhealthy dental conditions, and advised all to adopt a systematic practice of oral cleanliness.

Hon. HENRY E. FLETCHER, mayor of Providence, spoke briefly of the value of dental education, saying that while he was listening to the various speakers his mind had been occupied with the thought, how, if he were a man earning a "day's pay" like an ordinary workman, he could arrange to give his children the benefit of dental treatment. Mayor Fletcher assured the committee that he would do everything in his power to as-

sist in the work, and that he believed some means should be devised whereby the poor could receive dental care.

A leaflet setting forth in a most forceful way the principles of dental hygiene was freely distributed among the attendants of the conference and the school children of Providence. This leaflet reads as follows:

The Teeth, Their Use and Abuse.

"A man's health can only be as good as his teeth."

READ! THINK! REMEMBER!

Take Care of Your Teeth! Why?

Because your health depends upon your teeth.

Your teeth prepare your food for digestion.

Without good teeth you cannot digest your food.

Without proper digestion you cannot have health.

Brushing your teeth will prevent their decay.

Decay is due to uncleanness.

Disease is often caused by decayed teeth.

Do you visit a dentist twice a year, or do you wait until your teeth drive you to him?

A clean mouth is an evidence of refinement.

Get the habit of brushing your teeth!

Brush your teeth at least three times a day—once after each meal.

Brush between the teeth and around the gums; food gathers and sticks there.

Tooth-powder cleans the teeth and purifies the breath.

There is no doubt the spread of tuberculosis is often caused by decayed teeth.

From a health standpoint, it is more important to brush the teeth after each meal than to wash the face on rising.

Rules for Health.

Brush your teeth three times a day.

Do not spit on the sidewalk.

Sleep with your window open.

Do not put anything in your mouth but food and drink.

Exercise in the open air.

Keep your mouth and teeth clean.

Do not use a drinking-cup which has been used previously by another.

Never cough or sneeze in a person's face; turn your face to one side.

The programs given out also contained some very appropriate *aperçus*:

Imperfect digestion is often the result of imperfect teeth. This can be prevented.

There are 29,000 school children in the city of Providence. If 96.4 per cent. of them have poor teeth, then 27,955 of them need immediate attention.

Much of the spread of tuberculosis can be attributed to unclean mouths. A clean mouth helps to prevent tuberculosis.

Will your interest in children and their health induce you to assist in educating their parents to cause the teeth of the children to be kept clean and in repair?

Recently a group of 1203 children underwent a dental examination in the primary, grammar, and high schools of Providence; 96.4 per cent. were found to have decayed teeth. Why?

Of 1203 children examined, only 19.2 per cent. brushed their teeth regularly, 37.7 per cent. occasionally, and 43.1 per cent. never use a tooth-brush.

Of 1203 children in the public schools of Providence, 557 had suffered from aching teeth within two weeks and had received no dental attention.

Uncleanliness is the prime cause of decayed teeth. Decayed teeth cause great suffering.

A child cannot obtain a high standard of scholarship if his mind is disturbed by aching teeth.

It is undoubtedly true that a large percentage of nervous diseases of school children are influenced by decayed teeth and unhealthy conditions of the mouth.

DENTAL FACULTIES ASSOCIATION OF AMERICAN UNIVERSITIES.

Meeting for Organization—Philadelphia, June 5, 1909.

AT a meeting held in Boston on Friday, July 31, 1908, a conference of the representatives of the dental departments of the Universities of California, Harvard, Michigan, Minnesota, and Pennsylvania was held for the purpose of considering the advisability of forming a Faculties Association of the Dental Departments of American Universities.

Dr. James Truman forwarded for presentation at this meeting a draft of a proposed constitution and by-laws, and after a careful consideration of the question for which the meeting had been called, it was decided to resolve the meeting into a committee of the whole for the further consideration of a plan of organization. Of this committee, Dr. J. G. Sharp, representing the dental department of the University of California, was on motion elected temporary chairman, and the committee then adjourned to meet at the call of the chairman.

Pursuant to the resolution of adjournment, a meeting was called by the chairman to be held at the Bellevue-Stratford Hotel, Philadelphia, Pa., at 9 A.M., June 5, 1909, for the purpose of effecting a permanent organization.

The meeting was called to order at 10 A.M. by the temporary chairman, Dr. J. G. Sharp, and the following representatives, duly authorized by their several universities, were present: Dr. J. G. Sharp, dental department of the University of California; Dr. E. H. Smith, Harvard Dental School; Dr. N. S. Hoff, dental department of the University of Michigan; Dr. G. V. I. Brown, dental department of the University of Iowa;

Dr. Alfred Owre, dental department of the University of Minnesota, and Dr. Edward C. Kirk, dental department of the University of Pennsylvania.

Dr. Edward C. Kirk was appointed secretary *pro tem*.

After receiving the credentials of delegates presented by Drs. Hoff, Sharp, and Brown, it was moved by Dr. G. V. I. Brown, and seconded by Dr. E. H. Smith, that the meeting proceed to form a permanent organization. The motion was duly carried.

The chairman, Dr. Sharp, submitted a form of constitution and by-laws embodying suggestions of the various members, which he had collated and arranged during the interim since the previous meeting, and on motion of Dr. Eugene H. Smith, duly seconded, it was resolved that the constitution and by-laws be read and amended, and, after such amendments as were necessary, adopted article by article. The motion was carried.

After having revised the proposed constitution and by-laws and adopted the same article by article, it was adopted as a whole, upon motion of Dr. Eugene H. Smith, duly seconded by Dr. Alfred Owre.

Following is the constitution and by-laws as finally adopted:

Constitution and By-laws of the Dental Faculties Association of American Universities.

PREAMBLE.

WE, the representatives of University Dental Schools, realizing the need of active and uniform progress in the standards of Dental Education in America, hereby organize a University Dental Faculties Association, for the promotion of Dental Education.

CONSTITUTION AND BY-LAWS.

ARTICLE I.

NAME.

This organization shall be known as the DENTAL FACULTIES ASSOCIATION OF AMERICAN UNIVERSITIES.

ARTICLE II.

OBJECT.

The object of the Association shall be—To promote dental education; to improve the standard of preliminary education required for admission to dental schools; to establish reciprocal educational relations with its members, and ultimately to establish a national standard which may serve as the basis for a reciprocal interchange of dental licenses among the several states.

ARTICLE III.

MEMBERSHIP.

SECTION 1. The membership of this Association shall be limited to dental schools which are an integral part of state universities or of chartered universities of equal standing of the United States of America, holding membership in the Association of American Universities, demanding graduation from accredited high schools that require four years of high-school work, or the equivalent amount of education, for matriculation.

SEC. 2. All applications for membership must be filed with the Secretary at least ninety days before the next regular meeting of the Association, and shall be referred at once to the Executive Committee, who shall report thereon at the next regular meeting of the Association.

SEC. 3. A unanimous recommendation of the Executive Committee shall be required to make an applicant eligible for membership. A two-thirds vote of all members shall be required to elect.

SEC. 4. Each member of this Association shall have certain inalienable rights, including its business management, methods of pedagogy, and control of its internal affairs with relation to its parent institution, which shall not be revoked.

SEC. 5. No special or exclusive rights or privileges shall be granted to any member which may not at any time be altered or revoked.

ARTICLE IV.

DISTRIBUTION OF POWERS.

The functions of this Association shall be divided into Executive and Educational.

ARTICLE V.

OFFICERS.

SECTION 1. The officers shall consist of President, Vice-president, and Secretary-treasurer, who shall be elected by a majority vote at the annual meeting of this Association, and they each shall hold office for one year from the date of their election or until their successors shall have qualified.

Duties of Officers.

SEC. 2. The President shall preside at all meetings, and shall have a vote on all questions, but having so voted is not qualified to cast a deciding vote in case of a tie; shall appoint all committees not otherwise provided for; shall see that all resolutions are faithfully executed; shall have power to fill vacancies in office until the next regular election, subject to the approval of the Executive Committee; shall at the annual meeting render a report of the condition of the Association and make such recommendations as he deems necessary, and shall perform such other duties as pertain to his office.

SEC. 3. The Vice-president shall perform the duties of the President in his absence.

SEC. 4. The Secretary-treasurer shall keep a correct record of all official acts of the Association, such records to be open to the inspection of members at reasonable times; shall edit and publish the annual Proceedings of this Association, which shall contain—This Constitution, all rules, all resolutions submitted previous to or at the annual meeting, and the action taken upon the same, list of officers, standing and special committees and their reports, and such other matter as may be deemed important, all of which shall be approved by the Executive Committee before publication;

Shall submit a budget of estimated revenue and expenditures for the ensuing year to each member, sixty days before the annual meeting;

Shall keep a record of all matriculants in all colleges members of this Association, giving name, age, address, and preliminary qualifications of each matriculant, lists to be furnished by the dean of each college, together with the announcement for that year, within sixty days after the opening of the college—said list may be published as a reference in the annual Proceedings;

Shall conduct a bureau of general information pertaining to dental educational matters throughout the world, including reports of boards of dental examiners, announcements of dental colleges, state laws, foreign dental

colleges and preparatory schools, and all information of value to this Association;

Shall keep a file of all official correspondence of the officers of this Association, and replies thereto, and shall perform such other duties as pertain to his office;

Shall receive all fees and pay all bills, but only upon the authority of the Executive Committee or of this Association. Shall submit a detailed statement of all receipts and disbursements at each annual meeting;

Shall receive a salary of _____ for his services, payable annually; and

Shall render a report of his office at the annual meeting.

SEC. 5. The Executive Committee shall consist of the President *ex officio* and two other members elected at the first regular meeting of this Association, one of whom shall be elected for a term of one year and one for a term of two years, and at each regular meeting thereafter one member shall be elected to fill the vacancy.

Duties of Executive Committee.

The Executive Committee shall manage the business affairs of this Association during the interim between the annual meetings;

Shall designate the time and place of meetings;

Shall call all special meetings at the request of one-third of the members, designating the object of said meeting;

Shall direct the Secretary-treasurer to publish notices of all meetings in such journals as it deems advisable, at least sixty days before said meeting;

Shall audit the books and accounts of the officers of this Association; and

Shall render a report of its acts to the Association at the annual meeting.

ARTICLE VI.

FISCAL YEAR.

The fiscal year of this Association shall be from July 1st to June 30th, inclusive.

ARTICLE VII.

EDUCATIONAL DEPARTMENT.

SECTION 1. The Educational Committee shall consist of the President *ex officio* and three other members, one elected for one year, one for two years, and one for three years, and at each annual meeting one to be elected for three years to fill the vacancy. This committee shall select its own chairman.

Duties of Educational Committee.

The Educational Committee shall review all announcements of members of this Association;

Shall outline a preparatory course of study for matriculation, suggesting what subjects should be required and what subjects elective;

Shall advise as to the number of conditions allowable for matriculation;

Shall advise as to uniformity of curriculum, length of the sessions, and system of examinations, markings, and grades of scholarship;

Shall advise as to the conditions of promotion and admission to advanced standing;

Shall advise as to the standing of foreign preparatory and public schools and colleges, and foreign dental colleges;

Shall review all text and reference books;

Shall review foreign and American dental laws and educational measures; and

Shall determine the comparative value of the curriculum of other dental colleges not members of this Association.

Standard of Preliminary Education.

SEC. 2. No person, except one presenting a certificate of graduation from a high school giving a four years' course of study, or who presents credentials which give evidence of an equivalent scholastic preparation, is eligible for matriculation in any college a member of this Association, without taking an examination given by an examiner indorsed by this Association.

ARTICLE VIII.

FEES, FINES, ETC.

SECTION 1. The expense of the annual meeting shall be borne by this Association in a manner determined at the annual meeting, except that no member shall receive mileage or compensation from the Association.

SEC. 2. The annual membership fee of this Association shall be fifty dollars.

SEC. 3. No assessments shall be levied against the members of this Association except by majority vote at the annual meeting.

ARTICLE IX.

ENFORCEMENT OF RULES.

The enforcement of rules governing this Association shall be entrusted to the Executive Committee with power to act, subject to revision by the Association at its next annual meeting.

ARTICLE X.

REPRESENTATION.

SECTION 1. Each member of this Association shall be entitled to one representative, recommended by his faculty and duly authorized by his university, who shall be the voting member. In his absence a duly qualified alternate may be substituted by such voting member in writing.

SEC. 2. Other members of the faculties of the colleges which are members of this Association may be present at all meetings as delegates and take part in the discussion, and no other person shall be present without a majority consent of the Association.

SEC. 3. All delegates are eligible for office.

ARTICLE XI.

RESOLUTIONS.

SECTION 1. All matters to be presented to this Association for its action must be submitted in the form of a resolution in writing, and all resolutions of a general nature, approved by this Association, shall have a uniform operation.

SEC. 2. Except by unanimous consent at the annual meeting, no resolution shall be enacted unless it shall have been presented in writing to all members at least sixty days before said meeting.

ARTICLE XII.

AMENDMENTS.

Amendments to the Constitution and By-laws must be filed with the Secretary-treasurer at least ninety days before the annual meeting and be submitted by him immediately thereupon to all members, and said amendment may be presented for final action at such annual meeting. A two-thirds majority vote will be required to pass such amendment.

ARTICLE XIII.

QUORUM.

Two-thirds of the regular voting members shall constitute a quorum.

ARTICLE XIV.

ORDER OF BUSINESS.

1. Filing of credentials and payment of fees.
2. Roll-call of members.
3. Reading minutes of previous meeting.
4. President's report.
5. Secretary-treasurer's report.
6. Report of Executive Committee.
7. Report of Educational Committee.
8. Report of Special Committees,

9. Unfinished business.
10. New business.
11. Election of Officers.
12. Final reading of minutes.
13. Adjournment.

The meeting then proceeded to the election of permanent officers, with the following result:

President—Dr. J. G. Sharp.

Vice-president—Dr. Eugene H. Smith.

Secretary-treasurer—Dr. Edward C. Kirk.

Executive Committee—Dr. J. G. Sharp, *ex officio*, Dr. N. S. Hoff for one year, and Dr. G. V. I. Brown for two years.

Educational Committee—Dr. J. G. Sharp *ex officio*, Dr. Eugene H. Smith for one year, Dr. Edward C. Kirk for two years, Dr. Alfred Owre for three years.

Upon motion of Dr. Eugene H. Smith, seconded by Dr. N. S. Hoff, it was moved that the sum of two hundred dollars be appropriated from the funds of the Association to pay for clerical service in connection with the duties of the secretary-treasurer for the ensuing year. Motion carried.

Upon motion the secretary-treasurer was directed to send to each of the members a bill for annual dues.

The secretary-treasurer was further directed to send a report of the organization of the Dental Faculties Association of American Universities to the Associated Press, to foreign and domestic dental journals, to the National Commissioner of Education, to the Fédération Dentaire Internationale, to the secretaries of the several State Universities, to the National Association of Dental Examiners, to the National Association of Dental Faculties, and to the National Dental Association.

There being no further business, the meeting adjourned.

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Devoted to the Interests of the Profession.

EDITED BY

EDWARD C. KIRK, D.D.S., Sc.D.

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PHILADELPHIA, JULY 1909.

EDITORIAL DEPARTMENT.

AN EDUCATIONAL ADVANCE.

THE records of dental professional history show certain well-defined epochs which have had their inception in various movements that have exerted an energizing influence upon professional activity and stimulated its rate of advancement. Chief among these epoch-making events was the establishment of the first dental college in 1839, with its corollaries, the dental association and the dental journal.

Those who are familiar with the circumstances that led to the creation of the first dental school upon an independent basis are also familiar with the divergence of opinion then expressed as to the propriety of divorcing dental education from the sources of medical education. A very considerable number of reputable practitioners of dentistry were of the opinion that dentistry should be a part of medical education, and that facilities for dental instruction should be afforded by the then existing medical schools.

Indeed, it has been definitely stated and believed that Drs. Hayden and Harris were of that opinion, and that they made overtures to one of the medical schools in Baltimore to create chairs for the systematic instruction of dental students in connection with the medical course, and it is generally understood that the unwillingness of the medical faculty to accord with this plan, and its rejection by them, directly led to the establishment of the first college of dentistry in Baltimore upon an independent basis. During the succeeding seventy years colleges of dentistry have multiplied so that about fifty-five are now in operation in the United States alone. Not all, however, have been developed upon the strictly independent basis for which the original dental college formed the precedent. The idea of affiliation of dental with medical education has never been wholly dormant, and while the instances are relatively few, in this country at least, where the dental education has been superadded to a medical training, and while no single institution has attempted to include the dental qualification with the medical and cover both with the medical degree, yet a considerable number of medical colleges have added to their institutions dental departments in which the subjects common to the curricula of medicine and dentistry respectively are taught concurrently to both medical and dental students by the same teachers.

In 1867, dental education reached a new and epoch-making period in the precedent established by Harvard University, which took dental education under the fostering care of university affiliation and influence. This precedent was quickly followed by other universities, so that there has grown up a distinct class of dental educational institutions having that kind of affiliation and influence as their *motif*.

For a number of years all of the reputable dental schools of the United States held membership in the National Association of Dental Faculties, an organization which has done much to conserve and improve the standards of dental education in America, and reflexly throughout the world as well. Within its membership the three types of dental schools in existence were represented, viz, the independent or separate dental school, the dental departments of medical schools, and the dental departments of universities—each class having a different basis of organization and

each having by virtue of its relationships different attitudes toward the educational problem common to all.

By virtue of its purposes, the policy of the National Association of Dental Faculties has necessarily been inclusive rather than exclusive; the very nature of its aims required that it should contain within its membership all institutions for the teaching of dentistry having a colorable claim to reputability, in order that tendencies to departure from educational rectitude might be kept within the control of the organization. This unavoidable condition made it necessary that all educational standards prescribed by that association should be minimum standards, adapted to the capacity of the weakest schools in the membership, otherwise these could not be kept within the jurisdiction which such membership involved. Valuable as this arrangement has been in improving the educational work of the weaker institutions, it has to a corresponding degree acted as a handicap upon the advancement of schools better situated as to influence, facilities, and patronage, by creating a competition upon a less advanced basis which the stronger schools were compelled to meet at the level legalized by the National Association of Dental Faculties. The practical operation of this unequalized state of affairs has brought about an increasing dissatisfaction with the existing order of things in our national educational organization, and after serious and prolonged efforts to establish a *modus vivendi* among the several interests concerned, the dental schools which are departments of universities holding membership in the Association of American Universities have organized the University Dental Faculties Association, the details of which are set forth elsewhere in this issue. The movement is one which is in line with the general trend of higher education everywhere—that is, the centralizing of professional education within the institutions of higher learning, the universities of the world. That an organization of university dental schools should be effected is the logical consequence of their university affiliation; and for dental education the fact of university affiliation involves the same educational and economic factors that are involved in education for the law, medicine, engineering, architecture, and all of the avenues of higher learning. Under the centralized system of the universities the economic aspect of higher education finds its simplest solution, just as in commerce under a

centralized system the world's business is most economically transacted.

In the professions the education demanded is greater than the student pays for or can be expected to pay for, hence it is that it costs more to educate the student than the student pays for in tuition fees in all cases where the education demanded is delivered in fact and in good faith by the institution of higher learning. The universities are the only institutions, broadly speaking, that are in position to meet the demands for higher education upon an economic basis, for as a rule they are the only institutions able to make up the deficit between income from students' tuition fees and the cost of delivering to him the education which he demands. The only alternative open to the segregated institution dependent upon tuition fees to meet its educational and administrative expenses is to furnish a less expensive education, *i.e.* a less thorough education, to its students. Hence it is that we believe that this new organization of university dental school faculties marks a decided advance step in dental educational progress, and one which in time must receive the general co-operation and support—moral and material—of the whole dental profession.

REVIEW OF CURRENT DENTAL LITERATURE.

[*Correspondenz-Blatt für Zahnärzte*, Berlin,
January 1909.]

TUBERCULOSIS OF THE MAXILLÆ. By
PROF. DR. A. MICHEL, Würzburg.

The rare occurrence of tuberculosis of the alveolar process and the maxillæ has prompted the author's report of four cases of that nature. In regard to this disease, we have to distinguish between primary tuberculosis of the bone and secondary tuberculosis, which attacks the mucous membranes first and afterward invades the bone. In lupus we observe cases where the bone, after having been attacked secondarily, is destroyed more rapidly than the mucous membrane that has been primarily affected, and again we see cases in which the lupous decay involves only the

mucous membrane and the uppermost layer of bone, developing in a superficial periosteal way, while on the other hand, after the bone has become affected, the disease penetrates into the depth of the bone. While the disease in the first form requires months or even years to absorb the alveolar process, the second form produces great alterations in the interior of the bone within a few weeks or months, resulting in an osteitic, osteomyelitic process with all its well-known consequences. Thus, in most cases of lupus, the alveolar tuberculosis slowly spreads from the alveolar borders to the sharp osseous edge of the alveolus, and in a manner almost resembling pyorrhea alveolaris gradually melts down the bone, while primary tuberculosis of the bone is characterized by the establishment of tu-

berculous foci centrally situated in the osseous tissue independently of a previous tuberculosis of the mucous membrane. In such a case it is very difficult to say in what way the culprit bacilli have penetrated into the interior of the maxillary bone, which is intact in its cortical layer. The chances for the tubercle bacilli to get into the interior of the bone by way of the oral cavity are very slim, which explains the relatively rare occurrence of maxillary tuberculosis.

Four possible portals of entrance for the tubercle bacilli can be surmised: First, the alveolar pockets; second, traumatic lesions of the gingivæ; third, carious teeth with exposed and putrid pulps, and fourth, infection by way of the blood passages. By way of exclusion the oral cavity must be regarded as the passageway by which the bacilli enter into the circulation of the blood. Especially in children who at a very early age exhibit scrofulosis and tuberculosis of the bones and joints, a particular possibility for the bacilli to enter by way of the oral cavity seems to be present. At that age tuberculosis of the lymphatic glands is exceedingly typical. The tubercle bacilli, after having entered the mucous membrane, may use two ways of entering into the circulation, first by a capillary vessel, and second by the lymphatic vessels. The capillary vessels are probably protected against the invasion of the tubercle bacilli by the pressure of the serum tending outward, which is not present in the lymphatic vessels. This also explains the frequent occurrence of disease of the lymphatic glands.

Virchow attributes to the tubercle bacillus a special affinity for the lymphatic glands. The bacilli probably do not enter the epithelium during dentition, since the epithelium is uninjured up to the last moment before the eruption of the tooth; but during the continuous growth of the teeth, when continuous changes occur, the gingiva finding no support from the smooth enamel, and the dental ligament not yet having been formed, the alveolus consequently round the tooth being still wide open and filled with granulation tissue, unprotected or at the most protected by soft gingiva, the tubercle bacilli can enter.

Deposits of the tubercle bacilli in the bone are found at the portions where the bone grows intensively, at the juncture between epiphysis and diaphysis, where there is an irritation due to growth.

As for clinical symptoms, a swelling of the alveolar process or of the body of the maxilla is noted, which is in no wise distinguished from a subacute periodontic swelling. The hard infiltration ceases and breaks, discharging a greenish, cheesy pus mixed with serous fluid. If a sound is introduced into this generally large fistulous canal, rough carious bone is encountered, and eventually slightly bleeding granulations. These so-called cold abscesses generally cause little or no pain, and become troublesome only on account of the spreading infiltration, which causes disturbance in the physiognomic and the masticatory function of the patient. Mixed infection produces a more rapidly spreading acute inflammatory alteration of the tissue, and causes greater pain. Frequently larger or smaller sequestra are thrown off with or without surgical aid. If such a fistula is located near the epidermis, eczematous skin diseases are noted in its proximity. We also observe swelling and infiltration of the submental and submaxillary lymphatic glands. If the disease is confined to the alveolar process, frequently spongy, puffy, easily bleeding gingiva is present covered with viscous pus. The teeth become loose, and between the gingival pockets pus-producing granulations arise. After one or more alveolar sockets have been absorbed, the process may heal, or proceeding more deeply, may attack the body of the maxilla. Not all cases are of such benign nature. Especially in young individuals the process of destruction is more malignant and rapid, combining with a profuse formation of pus. Edematous infiltration of the face quickly forms; at the maxilla itself a quickly increasing, soft circumscribed area is formed which breaks through at one or more spots. The hard bone is entirely dissolved by granulation tissues of wide extent. The continuity of the bone is frequently interrupted by spontaneous fracture. Since in many cases carious teeth are found in the proximity of these tuberculous foci, it has been assumed that the tubercle bacilli have entered into the bone by way of the pulp-canals.

Tuberculosis of the maxilla after extraction may, however, be due to the tubercle bacilli centering their efforts around a spot of diminished resistance. Tuberculosis after such extractions takes the same course as described above, only a more severe, indolent swelling of the glands is noted, involving not only the

region of the mandible but also the lymphatic glands of the superior portion of the neck.

The diagnosis is therefore not easy except in typical cases, since every chronic osteomyelitic process assumes the same form. Anamnesis, other tuberculous disease, the presence of bacilli in the pus and secretion, and last, but not least, the typical swelling of the lymphatic glands, constitute sufficient symptoms. The occurrence of spontaneous fracture in osteomyelitic processes in conjunction with other symptoms may also indicate tuberculosis. Actinomycosis and lues most frequently cause confusion, the former especially showing great clinical similarity, although the formation of sequestra and the swelling of the lymphatic glands is lacking. If, however, mixed infection occurs, causing swelling of the lymphatic glands, and if it be impossible to find the characteristic actinomycotic glands, it is sometimes difficult to make a correct diagnosis. Luetic affections of the maxillæ are rather rare, and if they should occur, can be recognized by their location in the median line of the hard palate. Infectious osteomyelitic disease can easily be diagnosed by spontaneous pain, considerable sensitiveness to pressure of the lymphatic glands, and high temperature combined with dysorexia and malaise.

As for treatment, assuming timely diagnosis and circumscribed alveolar and maxillary affection, curetting of the tuberculous foci is the treatment indicated. If, however, the glands are implicated and the bone has been destroyed, it is necessary that surgical aid be called in.

The most successful therapy consists in prophylaxis, and if the teeth are to be regarded as portals of entrance for the tubercle bacilli, their undisturbed lodging in and about the teeth must be prevented. In treating a tuberculous patient, even though he show no sign of affection of the mucous membrane or lupous plaques, great caution must be taken. During the second dentition the remnants of pulpless deciduous teeth affected with chronic periodontitis are to be removed in time, since at that age the patient is most easily disposed to tuberculosis.

Dr. Michel then gives the clinical history of four cases of maxillary tuberculosis from his own practice, and cites several notable cases recorded in dental literature.

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PHENOMENA OF RESORPTION IN A RETAINED CANINE. BY PROF. DR. WILLIGER, Berlin.

It is a remarkable fact, and one which has not yet been sufficiently explained, that retained teeth after having lain quietly for years in the maxillæ suddenly become the seat of purulent inflammation, with sometimes serious symptoms. In such cases occasionally short, or very long, fistulous tracts are found, at the end of which the probe touches the retained tooth. Such teeth often make their appearance in an edentulous maxilla. By the progressive atrophy of the alveolar process, the apex of the tooth is finally exposed. Patients thus affected mostly wear dentures. In such mouths ulcers may arise; food remnants and bacteria may penetrate into the open pocket and produce inflammations. In such cases, however, we always find very short fistulous passages.

In three such cases the author found such openings in the maxillæ, from which the apex of the tooth peeped out. The patients were troubled with chronic inflammations or with permanent flow of pus. In all cases chronic pericementitis was exhibited high up near the roots, which had led to the formation of granular masses and to the erosion of the osseous cavities. The clinical and pathological anatomical picture was typical in every case. The portal of entrance for the infection was always the open gingival pocket, since the teeth appeared sound and intact and had living pulps.

If an extraction has been made in the region of the retained tooth, we may assume that during this extraction the mantle of connective tissue around the inclosed tooth was injured, and in this way the door was opened for carriers of infection. It is also quite conceivable that granulomata grow on neighboring dead teeth or roots, and thus permit the entrance of bacteria to its pericementum. If the diseased tooth is removed later on, there may likewise persist a long fistulous passage, and the operator may be induced to think of infection coming from without. Only in special cases when the possibility of such infection can be excluded with certainty, can the possibility of infection from the blood

passages be considered. This, in the author's opinion, does not seem to be impossible in retained teeth.

In general, retained teeth appear uninjured upon superficial examination. Occasionally they present markedly bent or misshapen roots; generally, however, they exhibit typical crown forms. This applies particularly to canines. After having caused fistulous suppuration for years, they may be superficially discolored or incrustated with calcium salts.

On careful observation, however, very peculiar alterations have been noticed in such cases. The author reports a case of an upper left canine in a nineteen-year-old patient. This tooth had caused no trouble whatever, the patient having been incommoded only by a tumor-like prominence which lifted his upper lip a little upward. As, owing to the social condition of this patient, a drawing-in of the tooth into the dental arch could not be accomplished, it was extracted at his request. No difficulties were encountered during the removal of the tooth, which was accomplished by lifting up the mucous membrane and chiseling. A completely developed canine was obtained, which on superficial examination exhibited no recognizable alterations, particularly no hypoplasia of the enamel. The pulp was examined histologically, and a few sections of the decalcified tooth were prepared, presenting a most remarkable picture, even macroscopically. About the center of the otherwise well-developed tooth, the dentin appeared to be perforated at three spots. Dark trabecular portions stood out from the light surroundings. Under low power, it was noticed that similar alterations existed below the points described and near the apex of the tooth. Under high power it was seen that the dentin, which was otherwise normally developed, had disappeared at all these points and had apparently been replaced by spongy osseous substance.

The two largest cavities occupied nearly the entire breadth of the dentin and extended closely up to the pulp. The pulp appeared to be in a healthy condition, and no union between it and the medullary tissue of the spongy substance could be recognized. On the other hand, opposite the three spots, a deposit of a layer of secondary dentin could be clearly observed, considerably narrowing the pulp-chamber. At the outer edge of one

of these spots a distinct opening was found where the medullary tissue must have been united with the pericementum. This important spot, which is very significant for the explanation of the whole process, lay in the root portion of the tooth, for the thin layer of cement could be seen quite distinctly, being deposited on the dentin in an upward and downward direction. In between was a thin layer of connective tissue which had belonged to the pericementum. Upon this a thick osseous layer followed, which surrounded irregularly shaped peninsulas of normal dentin. Still farther outward followed a layer of connective tissue inclosing an oblong osseous island. From the direction of the pericementum vascular connective tissue penetrated in long stretches into the dentin, and filled in a considerable cavity. At the edges of the cavity, with the exception of one portion which lay against the wall of the pulp chamber, everywhere more or less considerable, irregularly formed osseous deposits were noticed. In the cavity itself osseous trabeculae were found, partly connected with the wall and apparently forming an island. The entire appearance of the tooth strongly reminded one of the osseous portions of the alveolar process lying between and around the roots of the tooth. The osseous trabeculae were isolated, each one being surrounded with a light border layer. The dentinal border was irregular everywhere, and exhibited roundish bays and projections. The dentinal tubules ended abruptly as if cut off, and directly touched the bone. Only at a relatively circumscribed spot did the connective tissue directly touch the dentin, which showed large bays in the form of Howship's lacunae. No giant cells were found in this region, but a layer of dentin was noticed, distinguishable by its light color and by the absence of dentinal tubules.

The layer of secondary dentin was most remarkable; it could be distinctly recognized at the wall of the pulp chamber, the extension of which corresponded exactly to the area of resorption. There is no doubt as to this being a case of resorption; resorbed tissue has penetrated from the pericementum into the retained tooth, and has subsequently become ossified in parts. The resorption is shown, first, by the distinctly marked Howship's lacunae opposite the pulp-chamber wall; second, by the fact that the dentinal tubules

do not run in a curve around the bone, but are interrupted in their normal course by the bone deposited between. Furthermore the reaction of the odontoblast layer at the respective portions indicates absorption.

Resorption in teeth is nothing unusual, the shedding of the deciduous teeth being due to this phenomenon. It is generally recognized that the erupting tooth plays an important part, but in what manner is still questionable. The processes of resorption of the roots of pulpless teeth with chronic pericementitis is sufficiently explained by the new connective tissue contained in the granuloma being able to dissolve the hard tissue of the body. The granular tissue itself is formed by the action of the bacterial irritants. The tooth in question, however, was not exposed to any pressure from an erupting tooth, and the above factors are therefore out of the question. We can assume that the displaced canine, like a foreign body, has fallen a prey to resorption. The question arises whether this is at all possible in a vital tooth like this. Similar processes, however, occur during the resorption of the deciduous teeth. The pulps remain vital even at a very far advanced stage of resorption, and just as in this case, secondary dentin is formed at first opposite the points of resorption. It is very remarkable that in the case under observation the processes of resorption and deposition took place simultaneously, the loss in dentin being replaced to a great extent by osseous substance.

Judging from all this, it seems that the phenomena of resorption in retained teeth are subject to laws. It is left to future investigators to furnish us with a better explanation of these phenomena. All retained teeth which have caused suppuration or neuralgia should be subjected to histological examination.

The possibility of infection from the blood passages in such cases must not be overlooked. By the investigations of Lexer and others on hematogenous osteomyelitis, it has been proved that the immigration of exciting bacteria preferably occurs at the metaphyses of the long tubular bones. This is explained by the arrangement of the fine vascular and capillary loops in the first marrow spaces of the cartilagenous commissure with vascular sprouts, and by retardation of the blood

stream due to the physiological hyperemia present in the zone of development. In the tortuous long passages which the resorbing tissue forms in the dentin of retained teeth, a retardation of the blood stream is very easily conceivable. In this way a suitable place for the embolic attachment of bacteria is afforded. In unexplainable inflammatory diseases due to retained teeth, this possibility must not be lost sight of.

[*Le Laboratoire et le Progrès Dentaire*, Paris, January 24, 1909.]

EXPERIENCE IN CASTING UNDER PRESSURE. BY DR. O. SOLBRIG.

Before the American Dental Club of Paris Dr. Solbrig demonstrated some new points in his technique of casting which tend to do away with the last imperfections inherent to this process.

The most difficult piece to cast is doubtless a well-fitting plate, the gold having a tendency to not fill perfectly all the spaces left by the wax. The obstacle which prevents the gold from flowing into all the minute spaces is formed by the air that is not displaced from the fissures in the investment. These annoying fissures can be avoided by selecting a proper investment material, and oiling the inner surface of the flask before casting. As for the sprue-hole, a single canal of one and one-half millimeters diameter will meet all requirements. The flask must be heated to a lively red heat in order to retain the metal at fusion-point long enough to fill all the spaces before cooling. In order to allow all the air and the gases formed by the burning of the wax and the decomposition of the investment material to escape, vents are cut near the sprue-hole. To entirely avoid the formation of gases by the burning out of the wax, the method of a double investment was resorted to, as described below, allowing of a mechanical removal of the wax. Another important question is the contraction of the investment during the process of heating. After the mechanical removal of the wax, the author dries out the flask until no trace of steam is left, and the gold is poured into the cooled flask. This method is, however, applicable only to small pieces, since the gold solidifies too quickly to fill an extensive mold. At any rate, the presence of air in the heated mold

and the necessity of securing an easy outlet for the gases during the pouring of the cast was demonstrated beyond doubt. On the other hand, it is impossible to find for these vents a position which would guarantee absolute success. To avoid this difficulty, an investment material of coarse grain is used, which on account of its porosity allows the escape of the gases through the mass of the investment. Since, on the other hand, this investment would impart undue roughness to the plate, a thin coat of finer investment is first applied to the wax model, the whole technique of the casting being as follows:

The wax is prepared as usual, care being taken to obtain as smooth a surface as possible. The smoother the surface of the wax the smoother that of the cast plate. Still better results are obtained if, instead of simply smoothing the wax, its surface is painted by a fine and soft brush with a little talcum powder or whiting. The sprue is placed as usual. A quantity of finely grained investment material is prepared and applied with a brush on the free side of the wax. This cover of fine investment should have a uniform thickness of from one to two millimeters. Before that investment has had time to thoroughly dry, a second layer of coarse investment material is applied over the first one. This second layer is made sufficiently thick to enable the operator to remove the wax model without distorting it. After the layer of coarse investment is hardened, the whole is removed from the model, and again finely grained investment material is painted over the reverse side of the wax with a fine brush, so that the entire wax model is covered with a layer of finely grained investment of very moderate thickness (from one to two millimeters). Before this second layer of fine investment is entirely dry, it is covered with another layer of coarse investment. After the free end of the sprue is introduced into the crucible-former and sprue-holder, which has been previously oiled, the flask is put in place. The subsequent *modus operandi* is as usual. The castings thus obtained yield the best results imaginable. Moreover, this new investment does not undergo any shrinkage even under the high temperature required for successful casting. The castings fit absolutely perfectly on the model like rubber plates.

[*Le Monde Dentaire*, Paris, January 1909.]

UNCLEANLINESS OF THE ORAL CAVITY AND DENTAL CARIES. BY DR. CH. L. QUINCEROT.

Etiologically, an unclean condition of the oral cavity is the principal factor in the production of dental caries. While admitting that a certain number of predisposing factors such as sex, age, constitution, heredity, and defects in structure aggravate the production of caries, the author maintains that in the majority of cases uncleanliness is the initial cause. Uncleanliness means the presence of any mucous deposit of more or less creamy consistence, covering or lining the oral cavity and its organs. Its presence is noted in various degrees in man, woman, and child (in the last more frequently than is generally supposed), not only in times of apparently good health, but especially in delicate patients, in dyspeptics, in chlorotics, cachectics, in herpetism, arthritis, glycosuria, etc., and especially in certain pyrexial conditions. Gestation and lactation specially predispose women, in whom, without any other apparent symptom except more or less excessive pyalism, this condition may become chronic, which explains the bad condition of the teeth in pregnant women despite their claiming to take great care of their teeth. Besides, their teeth are more vulnerable because of the calcium salts required for their nutrition being partly diverted to the fetus, and owing to abnormal quantities of lactic acid in the saliva which carries these salts.

Dry mouths are immune to caries, as it were, while mouths with abundant saliva, especially if the latter is viscous, no matter whether alkaline or acid, with a tendency to forming creamy deposits, will surely exhibit sooner or later signs of caries. For independently of the corrosive effects which the acid saliva may have on the dental tissues, it aids fermentation by its adherence to the teeth, and offers the micro-organisms a brooding place where each can exercise its specificity. Knowing the detrimental effects of oral uncleanliness, the indifference of physicians to the oral hygiene of patients is surprising, for instead of doubling their vigilance, patients are often allowed to entirely neglect the hygiene of their mouths. Prophylaxis of dental caries by proper advice to the mother

and by subsequent care of the child is likewise the physician's duty, for by a properly regulated diet and reasonable hygiene generation after generation could be made more and more immune.

In sick persons who show symptoms of dental caries the mouth should be refreshed in order to keep the temperature down, and cleaned of mucous deposits by means of detergent mouth-washes. These washes should be slightly alkaline, the gingivæ should be massaged several times a day in order to remove the exudations or to at least eliminate the deposits which tend to lodge at the gingival edge. A soft brush should be gently passed over the dental arches, tooth-paste being preferable to powder because it can be introduced more easily into the interdental spaces. Elastic bands and floss silk dipped into some slightly alkaline solution should be insisted on, and the interstices between the teeth should be scoured several times a day in order to avoid any stagnation. Dentifrices with a borate of soda basis have a salutary effect on the gingivo-dental tissues; the atonic gingivæ must be stimulated and cautery applied to hypertrophied points. If in addition to these apparently complicated but in reality very simple measures, in the case of a pregnant woman, some pinches of calcium phosphate are added to the diet (although very little of this is assimilated by the digestion, yet this form is preferable to any dose of a medicinal dilution, which generally contains hydrochloric acid), and later on to that of the child during the period of dentition, the statistics of dental caries should be successfully reduced.

[*Les Annales Dentaires*, Paris, January 1909.]

A CASE OF REIMPLANTATION OF A SECOND MOLAR. BY DR. R. MONTÈS, ALGIERS.

Often the dental practitioner is called upon to extract a perfectly sound tooth because the patient is pressed for time. Encouraged by his success in the reimplantation of single-rooted teeth, the author ventured the implantation of an upper left second molar with strongly diverging roots. This tooth *in situ* was attacked by caries of the third degree, the pulp being infected. The canals were disinfected with sulfuric acid, then with a 40 per cent. solution of formol, and filled with

trioxymethylene paste. The chamber was sealed with gutta-percha. A month later the patient presented for final filling, not having experienced any trouble in mastication nor sensitiveness to heat or cold. The tooth was filled with amalgam, gutta-percha being inserted in the pulp-canals.

Two weeks later the tooth became very sensitive to heat, and for fear of infection the tooth was opened up once more; the canals, which showed no untoward symptoms, were disinfected again and sealed with gutta-percha. A month later a violent relapse occurred. Cautery proving to be of no avail, and infection of the roots or cysts at the apex being suspected, the tooth was extracted at the patient's request and reimplantation resorted to. The extremities of the roots which showed traces of cysts, especially the palatal one, were resected, and the suspicious portions scraped without injury to the sound ligament. After the canals had been enlarged with Gates reamers they were filled with gutta-percha up to the apex, and the tooth was filled with amalgam and kept in a glass vessel with tepid water to which some hydrogen dioxid was added. The alveolus was washed with warm water, and the small hemorrhage stopped, and in spite of the diverging roots the tooth, after some trying and with the application of some force, was pressed into place, which was indicated by the characteristic crepitating noise. Slight yet tolerable pain was felt during the night. Frequent washing of the mouth with hot water mixed with a solution of hydrogen dioxid was ordered. Without suppuration or any other trouble the tooth remained loose in the mouth for about a month, when it became so firm as to be indistinguishable from the other teeth, except for being a little less susceptible to percussion. Evidently the dental ligament which had remained intact adhered again firmly to the maxilla.

The question arises how long the tooth will last. Some reimplanted teeth have lasted for seven or eight years. In the author's practice a reimplanted lower molar which had to be extracted, after about one year exhibited complete absorption of the roots. In another patient a reimplanted lower molar has solidly remained in the jaw now for nearly three years, showing but slight outward deviation without disturbing the articulation. The

technique of this useful and interesting operation is still too young to permit of final conclusions as to the durability of implanted teeth.

[*Revue Générale de l'Art Dentaire*, Paris, January 1909.]

THE CORRECTION OF INVERSE ANTAGONISM. BY DR. A. SIFFRE.

The correction of inverse antagonism which is generally, though wrongly, called retroversion, has been brought about by regulating appliances intended for two purposes—first and principally the elevation of the articulation, *i.e.* opening of the bite, and secondly the forward movement of one or several teeth. Although the construction of these apparatus is simple enough, the author suggests a further simplification which yields perfect results even in difficult and complicated cases. Normally the mandible is held at a slight distance from the maxilla, and the teeth are not in contact. In fact a muscular effort is needed to bring the teeth in contact during mastication and deglutition. Muscular contraction constitutes a pathological phenomenon, and the grinding of the teeth during sleep is only observed in nervous patients. It is therefore unnecessary to artificially open the bite, since it is open by nature, and basing on these correct deductions Dr. Siffre has corrected inverse antagonism by a simple plate, without forcefully opening the bite.

This apparatus consists of a simple rubber plate which at the point of contact with the tooth to be regulated has a reinforcement to which a curved wooden peg is fastened. As soon as this peg begins to push the tooth it is displaced, and owing to the slight pain felt the jaws are held apart consciously or unconsciously day and night. As soon as the antagonism is corrected, the last peg which has terminated the forward movement of the tooth has fulfilled its purpose. By this method only one apparatus needs to be constructed, and the time necessary for the completion of the regulation is not much longer than that required by the ordinary apparatuses for raising the articulation. It is applicable to one or more teeth, and its action is equally powerful. The only inconvenience of this apparatus, which is to be worn day and night, is that the pegs must be renewed from time to time. With the aid of a curved spring fixed in the plate and ending in a straight stem which touches the tooth to be regulated, the inconvenience of the peg may be avoided and the regulation accomplished without any trouble to parents or child. Not every parent can bring his child often to the dentist, nor can the child leave school very conveniently. The gentle and continuous action of this apparatus is of prime importance, and the operator must never try to gain time by augmenting the force of the regulating apparatus.

PERISCOPE.

Gold Dentures.—To make a double-plate gold denture, secure a fusible metal die from the impression; on this die swage a No. 30 gage gold plate; solder the finishing wire to the edge. This plate is then used as a soft metal base-plate until the teeth are articulated and all contouring of wax is finished. Then slightly oil the lingual surface and pour a plaster core into it; when set, remove the core, make a matrix of plaster of Paris around it, and pour fusible metal over it. This gives a die of the lingual surface of the denture, into which the second or top plate is swaged.

The last plate swaged is then placed in position, and the case is flaked in order to prevent any alteration in the bite. The plates are then removed from the flask and soldered. The top plate should be left one-eighth of an inch shorter than the bottom plate, as this leaves an edge at the distal end upon which pieces of solder are laid. Retaining tags are soldered to the buccal and labial surfaces to give attachment to the rubber; it is again placed in the flask, and the case is ready to pack, vulcanize, and finish.—W. A. GIFFEN, *Dental Register*.

Soldering Fluid.—To facilitate the flow of the solder in soldering a metal piece, and to avoid the displacement of the backings, apply with a spatula a thin coat of borax jelly at the portions to be united, place the backings in their correct positions, and the union will be a remarkably good one. Formula for the borax jelly: Grind the borax as finely as possible and mix it in a mortar with two parts of pure vaselin.—*Le Monde Dentaire*.

Clasps in Inclined Teeth.—Frequently a vulcanite plate is demanded for a mouth in which two strongly inclined second molars remain standing. This inclination prevents proper adhesion as well as the proper action of clasps. To overcome this difficulty, the inclined molars are fitted with gold crowns, to which a normally directed, vertical saddle crown of thicker gold has been soldered. These two vertical crowns afford a strong hold for exactly fitting clasps.—MAX ORDOVER, *Pawelz' Zahntechnische Reform*.

Gold Inlay with Dowel.—We all know the strain and stress that is placed on a large contour filling, especially if it takes in the incisal edge, and we have all been unfortunate enough to have had more or less of our large contour inlays broken out; but by using a dowel, it is impossible to break them out; moreover, the method of applying a dowel is simple. Devitalize and prepare the canal for the dowel, then prepare the cavity in the same way as for any ordinary cast inlay; place the dowel in position, warm the wax, place it in the cavity, and shape it up as desired. Then withdraw the dowel with the wax model, invest, and cast. In this way you obtain an inlay that it is impossible to break out.—C. JENSEN, *Dental Summary*.

Wiring Loose Teeth.—In wiring loose teeth together, instead of weaving a wire in and out around each tooth and then back the same way, it will often be found easier and better to use a double wire, making one loop around all the teeth involved, and twisting the ends together at a convenient place with pliers, but not drawing the loop tightly. Then take shorter bits of wire and make as many long staples as ties between the teeth are wanted. Push them from the inside outwardly, one leg of staple below the wire loop and the other above. Twist these ends with pliers, drawing the loop wires together—or toward each other between the teeth. This will tighten the loop up and make it hug every tooth, holding loose teeth in line so firmly that they can scarcely be moved any more than the solid teeth, and may be so

held for months. The twisted ends cut off at a reasonable length are then bent over in between the teeth. Of course, any wired teeth will catch some food particles, but these may mostly be removed by rinsing thoroughly. Round wires against the teeth do not hold secretions like flat bands, which usually cause decay after a few months or even a few weeks. No decay will occur on account of round wires if any precaution is taken to flush out, and sometimes perhaps to pick out some of the collected food. Loose teeth held in this way for months and properly sealed and treated have often become very firm and healthy again.—R. B. TULLER, *Amer. Dental Journal*.

Anesthetizing Lower Molars.—The lower molars are, taking it all around, the most difficult teeth to anesthetize. Leaving out of consideration the difficulty of access, the gum tissue on the buccal surface is often so thin, and the bone so dense on both sides of the teeth that it is harder to get a satisfactory degree of analgesia than in other parts of the mouth. Inject on the lingual side first very thoroughly; on the buccal surface inject just in front of the anterior root, closely against the alveolus from the start. Then withdraw the needle and insert it again in a slanting direction between the roots, and use firm pressure. The patience required in this procedure will be rewarded with complete absence of pain, and satisfaction to both patient and surgeon.—B. BENNETTE, *Brit. Journ. of Dental Science*.

Indications for the Extraction of Deciduous Teeth.—(1) Deciduous teeth which have become so loose as to be not only useless but annoying to the tongue and lips, and liable to be dislodged at any time.

(2) Deciduous teeth which are impeding the eruption of their permanent successors, or causing the latter to deviate from their normal position.

(3) Carious or injured deciduous teeth giving rise to pain or swelling of the surrounding parts at a time when their functional period is, or should be, nearly at an end.

(4) In a fretful and nervous child, when the saving of an aching tooth would require a rather long and tedious operation and when the child's health has evidently suffered from sleepless nights.

(5) Deciduous teeth in connection with which there is an abscess, sinus, or other pathologic condition which will not yield to other treatment, or where the necrosed roots have protruded through the gum and caused ulceration of the cheeks or lips.

(6) Deciduous teeth causing or aggravating ulceration of the tongue, lips, cheeks, or other adjoining soft tissues, when the tooth or teeth in question are not readily amenable to other treatment.

(7) Deciduous teeth apparently the direct cause of enlargement of lymphatic glands, or where such teeth possibly act as a source of irritation to already diseased lymphatic tissues.—W. H. CORNELIUS, *Dental Record*.

Cast Gold Plates.—The simplest method of obtaining a gold plate at one casting with the porcelain teeth in position is the following: Adjust the teeth and mark the contours on the model with a fine point or a sharp pencil. Cut the pins almost flush with the enamel of the tooth and file them flat. After washing them in alcohol back the teeth with a No. 5 wax sheet. Adjust the clasps. Oil the model and the clasps which are fastened to the stearin-coated model. Carve the wax as carefully as possible, set up the teeth in the correct positions which they are to occupy. Place the sprue-wire, invest in fine investment, covering the teeth entirely, but not the clasps, which remain fastened on the model. Cast the piece, clean it, replace it on the model, fasten the clasps with wax, invest in plaster and earth, solder the clasps, and finish.—H. LÉGER-DOREZ, *Le Monde Dentaire*.

Fractures of the Mandible Just Behind the Molar Teeth.—This fracture is usually oblique—from before backward and downward—and the displacement is difficult to correct. The body of the jaw drops downward and backward, and the ramus slides forward. No dental splint is practicable, because there are no teeth on one side of the fracture to which a splint can be attached. Therefore the reduction is maintained by the use of an outside pad and a metal chin fence buckle and strap splint. Reduction is accomplished by pressure backward upon the ramus with the thumb in the mouth and a lifting forward and upward of the body of the jaw. A perfect reduction can be produced by watching the patient for twenty-four hours, as there will be a slumping away, and the fracture and fragments will be found partially reduced in that time. If pressure is applied upon the bandage straps a second time, the fragments will come into apposition with comparative ease. Be careful and repeat the adjustment of the bandages and straps, and after a week or ten days the jaw will be found to be in good position, with perfect articulation.—D. R. ALLEN, *Dental Brief*.

Disinfection of Tooth-Brushes.—The discouraging results of dental and oral hygiene in many cases are doubtless due to a neglect of the disinfection of the tooth-brush. Boiling being unpractical, an antiseptic solution which involves no dangers for the teeth or the oral cavity may be applied. Alcohol is most recommendable; it may be used with any kind of brush except a celluloid brush and need not be washed off before applying the brush in the mouth. After using, the brush is thoroughly rinsed and put back into the alcohol. If the bristles of new brushes show a tendency to become hard, the alcohol is diluted with one-third of water for some time, which does not seriously impair its disinfecting powers. Vessels especially constructed for the disinfection of tooth-brushes will facilitate for the public this hygienic precaution. A glass or porcelain bottle with a hollow, dome-shaped glass top, into which the end of the brush protrudes, or any wide-necked bottle, in which the brush is hung by a string, may be used, both contrivances preserving the strength of the alcohol and allowing of a ready handling of the brush.—E. HARTUNG, *Deutsche Zahnärztliche Wochenschrift*.

Manipulation of Silicate Cements.—Before mixing powder and liquid, be very sure that every desired instrument is in place, and if no matrix is used, have ready a celluloid strip slightly coated with cocoa butter; place the powder and the liquid on the glass slab, draw a small portion of the powder into the liquid, spatulate thoroughly with an onyx spatula—only light pressure is needed in spatulating—and add powder until the mix is of the desired consistence. Take up a small portion on the end of a small instrument (and notwithstanding any directions accompanying the product, refrain from using any vaselin, oil, or cocoa butter on your instruments; it is unnecessary, and many fillings have been ruined by such practice), smear the inside of the cavity, filling any existing under-cuts. Then add sufficient cement to fill the cavity, place the celluloid strip between the teeth, lap it over the labial and lingual surfaces, draw tightly, and with a flat burnisher burnish over the outside of the strip, holding it for a moment or so with pressure before removing. This is for approximal cavities in anterior teeth; if used in posterior teeth your judgment will easily suggest means for different cavities—remember not to handle or burnish with steel instruments, or you will have a discoloration. The dam should be left on for at least thirty minutes.

The ideal surface is that left by the celluloid strip, but I find it always necessary

to use strips and disks to remove the surplus over margins. This, of course, destroys the glaze, which can be reproduced by cuttlefish disks, taking a piece of white silk tape, slightly coated with cocoa butter. Cover this with the same powder that was used for filling, and by drawing back and forth between the teeth a good surface is obtained. This is the most satisfactory of many ways tried.—J. P. ROOT, *Dental Summary*.

Cast Gold Inlays with Pins or Loops.—

If it is of advantage to have greater security to the inlay, attachment pins or loops may be made to the inlay. This can be done by removing the matrix and embedding it in some softened compound; then holes are drilled through the matrix in suitable position, and pins are inserted in the holes and extended from the matrix as the depth of the cavity will allow. In this case a core of cement is used at the base of the cavity over which to construct the matrix, and previously to the insertion of the inlay attachment it is removed to allow of a reception for the attachments. In a case where the entire occluding surface is involved, the whole surface of the crown can be ground down to healthy tissue; on the surface retentive holes are drilled for the insertion of pins. An inlay cast to this surface will form a complete cap over the occluding surface.—THEODORE C. TRIGGER, *Dental Brief*.

Administration of Cocain.—The following method is in the writer's opinion the best and the safest, and likewise by far the cheapest. (1) If there are many extractions, the patient first uses a hot antiseptic mouth-wash for five minutes or so. (2) A sterile syringe holding 35 minims is filled with clean water. This is ejected into a test tube or gold-cylinder bottle and boiled. (3) When it has cooled somewhat, $\frac{1}{2}$ grain of cocain and 3 minims of adrenalin chlorid are added. (4) This is taken up again in the syringe and injected, the site of injection being first wiped over with a swab of strong antiseptic.

The advantages are: (1) A fresh and absolutely sterile solution for each patient. (2) The total amount of cocain used is absolutely under control. The solution suggested makes a 0.5 per cent. solution of cocain, and this is sufficient for the extraction of three teeth after waiting three or four minutes. (3) The absence of any irritating drugs from the injection.

Not more than two syringefuls should be used at one sitting. The adrenalin chlorid should be preserved in sealed glass ampules, the only way in which it will keep sterile and

active. Beta-eucain may be employed in a similar way, but $\frac{1}{2}$ instead of $\frac{1}{4}$ grain may be used at each injection, with equally good results. In cases where it is known that the patient has an idiosyncrasy for cocain, has a very weak heart, or is highly neurotic and objects to cocain, excellent results may be obtained by this method, omitting the cocain altogether and using only 2 minims of adrenalin chlorid and operating immediately, while the tissue is well blanched.—H. P. PICKERILL, *New Zealand Dental Journal*.

To Strengthen a Bridge.—Posterior bridges with barrel crowns for abutments are subject to frequent breakage, the bridge body becoming detached from one of the abutments. To strengthen the crowns, some solder a band of gold plate around them. A much better and easier way is as follows: Cut some 22-k. solder to form a band covering the whole surface facing of the space for the dummies, and about one-third the width of the remaining surfaces of the band of the crown. Prepare the band of the crown with borax, place the band of solder in position, and attach in a Bunsen flame. As soon as the solder begins to flow remove the band from the flame, and strengthen the cup with 18-k. solder. The whole procedure takes about two minutes, produces a nice contour on the crown, requiring little finishing, and is an excellent aid for the final soldering, insuring a perfect joint between the facings and abutments, which otherwise is often secured with difficulty.—M. A. GOTTLIEB, *Odontologist*.

Oblique or Incomplete Fracture of the Jaw.—The splint to be used in a case of fracture of this kind is of swaged aluminum, carrying the aluminum well over the alveolar margin and teeth, perforating it by making a single hole at each single tooth and from two to three on double teeth. Mix cement with cotton and apply to the splint, adjusting the same, and allowing the cement to crystallize thoroughly before removing the excess.

After-treatment. From six weeks to two months are necessary to insure firm union and freedom from complications. The swelling is soon subdued. The patient is put on spoon diet exclusively for a week or ten days, followed by light food until he is able to masticate. In the case of weak, nervous patients, when shock from accident is an element, prescribe strychnin $\frac{1}{60}$ grain, to be given two or three times daily, as indicated by the seriousness of the shock, and as long as any evidence of shock remains.

By all means keep your patient's nose and

mouth in an aseptic condition by swabbing thoroughly each day—this being done after feeding. Any kind of mouth-wash may be used. Listerine, two teaspoonfuls to one-half cup of water, is good. To prevent the saliva from dribbling, and to keep the parts as dry as possible, place gauze under the cheek, below the excretory ducts.—D. R. ALLEN, *Dental Brief*.

Perfect Marginal Adaptation of Cast Gold Inlays.—To make certain of a perfect marginal adaptation of cast gold inlays, a gold foil matrix is burnished into the cavity; in difficult cases the burnishing may be done on an easily prepared Spence model. The matrix is filled with wax *in situ* as usual; naturally the gold is not oiled. Gold and wax are removed together and treated as usual. Inlays made in this way generally show perfect marginal adaptation, since bubbles are avoided or form below the gold foil, where they are harmless. By this method faulty wax models are also avoided, especially if the wax, formed into a pointed cone, is not too soft when being pressed into the cavity. Any very minute defects in the marginal adaptation can, if necessary, be corrected with the surplus of gold foil.—Dr. KNOCHE, *Deutsche Monats-schrift für Zahnheilkunde*.

Pickling Vulcanite Plates.—Pack the rubber so carefully that a uniform thickness is obtained; vulcanize rather a little too much than just right. Wash carefully, and with a fine spatula remove all the particles of plaster that may adhere to the plate. Then mix in a wide glass equal parts of commercial nitric acid and sulfuric acid, and immerse the piece for one-quarter of a minute. On the surface of the mixture a coat of foam of the color of the rubber used will appear, which after the piece is withdrawn with a wooden stick will be seen to cover the whole piece. After this foam has been washed and brushed off in plenty of water, the plate is dropped once more into the liquid and allowed to remain another one-quarter of a minute. If after washing some imperfection is still noticed, a third acid bath and washing is applied. The plate is then dried and submerged in ammonia and subjected to long and thorough brushing. This removes all traces of acid and any coloring matter due to the pickling. After freely washing with soap, the piece is ready to be placed in the mouth. The great advantage over the old tin-foil method is that the reproduction of the oral tissues is a much more perfect and exact one.—H. LÉGER-DOREZ, *Le Laboratoire et Le Progrès Dentaire*.

HINTS, QUERIES, AND COMMENTS.

CLEAN IMPRESSION TRAYS.

FROM time to time various methods are suggested for cleaning impression trays. There is really no reason for their becoming dirty. A plaster impression leaves the tray so clean that after rubbing with a cloth and sterilizing it is again ready for use.

Most trouble is caused by the improper use of modeling compound. After the model in a compound impression has been poured and allowed to harden, trim off any compound which overhangs the tray. Then cool thoroughly under the faucet, and by inserting a plaster knife between the heel of the tray and the impression material, the tray may easily be prized off, clean and free from compound. After removing the tray put the model with the compound in hot water, and separate in the usual way.

Modeling compound will not stick to a polished tray after both compound and tray are thoroughly chilled.

C. M. TORRANCE, D.M.D.

Frankfurt a. M.

TO PREVENT INLAY WAX FROM STICKING TO INSTRUMENTS.

A GOOD many of our most moldable waxes used for models in casting inlays are more or less sticky, so that the instruments used in carving become gummed up and drag. By dipping them in vaselin frequently, all trouble of this kind is entirely obviated in any make of wax, and the result is a good, clean-cut, smooth surface.

F. H. SKINNER, D.D.S.

Chicago, Ill.

OBITUARY.

DR. B. OSCAR DOYLE.

DIED, at Louisville, Ky., May 4, 1909, of acute cardiac dilatation, B. OSCAR DOYLE, D.D.S., in his sixty-fourth year.

The painfully sudden death of Dr. Doyle occurred on a street car while he was returning from a visit to his summer home in Prospect, a suburb of Louisville.

Dr. Doyle was born in the city of Louisville, on October 2, 1845, and on both sides of his family came of fine old Revolutionary stock. His father, William Postleweight Doyle, came to Louisville from Doylestown, Pa. His paternal grandmother was Elizabeth Postleweight Doyle of Lancaster, Pa., whose family had many prominent soldiers in the Revolutionary war. Jonathan Doyle, his paternal grandfather, was born in the north of Ireland and removed to Scotland. Dr. Doyle's mother, Katherine F. Alsop Doyle was born in Culpeper, Va., and was the granddaughter of Capt. John Alsop, who was the first patriot to fit out a fleet to fight the British. Her mother was Nancy Mardis, of a famous old Puritan family in Boston.

Seeking a vocation along the lines of natural aptitude, Dr. Doyle chose the profession of dentistry, and from 1862 to 1866 was successively under the tutelage of Dr. Dwyer and Drs. Green and McClelland of Louisville, subsequently entering the Ohio College of Dental Surgery, from which he was graduated in 1873. He was subsequently for a number of years an honored member of the board of trustees of that institution. For several years he was a member of the state board of dental examiners and was president of that body. He was a former president of the Kentucky State Dental Association, a member of the American Dental Association, an honorary member of the Psi Omega Dental Society, and of the Falls City Dental Club.

In addition to active membership in the Commercial Club and the Fourth Avenue Methodist Church of Louisville, Dr. Doyle stood high in local secret society circles, holding membership in the Falls City Lodge, No.

376, F. and A. M.; King Solomon Chapter, No. 5, Royal Arch Masons; life member of the DeMolay Commandery, No. 12, Knights Templar; Kosiar Temple, Mystic Shrine, Scottish Society, and being thirty-three years treasurer of Home Lodge, No. 29, I. O. O. F., which is now known as Boone Lodge, No. 1.

Dignified and unassuming, Dr. Doyle was a typical gentleman of the "old school," and in his death the dental profession of Kentucky and the South at large loses one of its most talented and representative members, and the community of Louisville one of its most exemplary and esteemed citizens.

In 1874 Dr. Doyle married Miss Ruth Whiteside, of Cassville, Huntington county, Pa., who survives him, as does his daughter, Mrs. William J. Johnson of Uniontown, Pa., three sons—Dr. Oscar W. Doyle, a physician; Dr. Howard S. Doyle, a dentist, and Chester L. Doyle, a mechanical engineer, all of Louisville—and two sisters, Mrs. Emma Jones of Louisville and Mrs. Minnie Henderson of Saltillo, Pa.

THE following resolutions were unanimously adopted at the annual meeting of the Kentucky State Dental Association, at Crab Orchard Springs, Kentucky, May 17, 18, and 19, 1909:

Whereas, God, in His mysterious providence has taken from us our friend and co-worker, Dr. B. Oscar Doyle, who was one of our most loved associates and a life member of this society; therefore be it

RESOLVED, That in the passing away of Dr. Doyle the Kentucky State Dental Association has lost a most faithful and valued member, who contributed much to the success of this association and to the advancement and uplift of his profession; and be it further

RESOLVED, That we enshrine in our hearts and strive to emulate his noble traits of character, which brought to him the love and respect of his associates in such large measure; and be it

RESOLVED, That a copy of these resolutions be inscribed upon our minutes, on a page set

aside for that purpose alone, as a memorial to Dr. Doyle; that a copy of these resolutions be engrossed and sent to his bereaved family, and that we express our sincere sympathy in this the hour of their sorrow.

H. B. TILESTON, *Chairman*,
MAX M. EBLE,
J. F. REES.

DR. S. LEE RYMER.

DIED, in his seventy-sixth year, at his home in Croydon, England, March 7, 1909, SAMUEL LEE RYMER, J.P., L.D.S.Eng.

With the passing of Dr. Rymer the dental profession of England has lost a most distinguished personality which shed the luster of disinterested leadership in the darkest ages of dental science.

Dr. Rymer was born at Plymouth in 1832. His early life was passed at St. Servan, Brittany, where his father was established for several years as a physician. About the age of thirteen he was receiving education at Cheltenham, England, and later became the pupil of Mr. W. Perkins, and availed himself of a good opportunity of learning dental mechanics. He obtained his surgical instruction at the Western General Infirmary, where the dental practice was extensive. At the age of twenty-one Dr. Rymer commenced practice at Croydon, and became dental surgeon to the Croydon Hospital.

The life and the activities of Dr. Rymer are closely interwoven with the history of the organization of the dental profession in England, he having taken a most prominent part in the founding of the College of Dentists. He was keenly interested in all dental reform movements, signalizing his progressive spirit by submission to examination for the dental license of the Royal College of Surgeons and his eager participation in all subsequent movements for dental reform. Being an original member of the British Dental Association, he filled with dignity the position of president at the 1889 meeting at Brighton, and was made vice-president, and a trustee of the Benevolent Fund of that society. In 1882 he filled the honorable position of president of the Odontological Society, and for many years was treasurer of the National Dental Hospital, where his name is perpetuated by a gold medal awarded annually to the most efficient student.

Dr. Rymer took a conspicuous part in the public, municipal, philanthropic, and religious affairs of Croydon. He was a member of its board of health from 1870 until 1883, when, upon the incorporation of the borough, he became an alderman, retaining that office until his death, and serving in 1893-94 as mayor; he was also a justice of the peace. He was one of the founders of the Croydon General Hospital and of the Croydon Literary and Scientific Institution, and since 1892 had been chairman of the governors of the Whitgift Foundation.

In 1856 he married Elizabeth Gresham, a direct descendant of Sir Thomas Gresham.

The funeral took place in Queen's Road Cemetery, amid general tokens of regret and respect. Amongst the floral emblems sent were some from the Odontological Section of the Royal Society of Medicine, the Southern Counties Branch of the British Dental Association, and the National Dental Hospital.

"IN MEMORIAM" RESOLUTIONS.

Dr. Wm. P. Loppentheim.

THE following resolutions were adopted by the Arizona Board of Dental Examiners upon the death of Dr. Wm. P. Loppentheim:

Whereas, The Arizona Board of Dental Examiners learns with deepest sorrow and regret of the death of one of its most active members, Dr. Wm. P. Loppentheim; and

Whereas, Dr. Loppentheim's admirable personal qualities, high professional attainments, and exalted ideals commanded the profoundest respect of all; therefore, be it

RESOLVED, That in the death of Dr. Wm. P. Loppentheim the public, the dental profession, and the dental board have suffered an irreparable loss. Although for years in failing health, he labored on to the last with untiring energy and undaunted zeal, conscientiously serving his patients and his profession, and setting an example that others may well emulate.

RESOLVED, That the members of this board extend to the bereaved family in its affliction their sincere sympathy.

RESOLVED, That these resolutions be sent to the widow of our departed member and be spread upon the minutes of this board, and that copies be forwarded to the dental journals for publication.

J. HARVEY BLAIN, *Sec'y*.

DENTAL COLLEGE COMMENCEMENTS.

ATLANTA DENTAL COLLEGE.

THE annual commencement exercises of the Atlanta Dental College were held in the Grand Opera House, Atlanta, Ga., April 30, 1909.

The valedictory address was delivered by R. R. Douglas.

The degree of Doctor of Dental Surgery was conferred by Judge Wm. R. Hammond on the following graduates:

Andrew David Abernethy	K. McGowen Hodges	Webster O'Quin
Hugh Avary	John Styers Hoffman	William Moore Patrick
Harold Avary	Maxwell Ellis Hoffman	John Burckmyer Patrick
Ulysses B. Burkett	Carlie Preston Holtzendorff	Carl Picket
Joseph Lawton Campbell	Benjamin Franklin Hunter	John Joseph Powell
George Virdamon Cannon	Charles Kerrison	William Angus Ray
Columbus H. Christian	Edwin H. Kerrison	James Reeves Richardson
Ernest E. Covington	Worth Marvin Laurence	Nealie Edward Ross
Henry Pelham Corry	William Hartridge Lee	Frederick Stuart Roux
John Jarvis Dale	William Homer Leggett	Daniel Coleman Sanders
Sterling Lafayette Davis	Robert Lee Logan	Hannibal Napoleon Simpson
Carl Ellis Daws	Darius McNees	Clinton W. Stephens
Romanus Roscoe Douglas	Frank C. McDaniel	George Herbert Stevenson
John Henry Foster	Moses T. McCall	Wadsworth Owen Strickland
Theran J. Ford	Robert Claude McCabe	Hugh Washington Taylor
Esta S. Furr	Cornelius Malone	Barnard Athelston Thomas
Edwin B. Garrison	Hermit Utah Mashburn	Henry Melton Thompson
John Wesley Golson	Edison I. Mason	Evan Lafayette Townsend
Horace Putnam Gurr	Howell Thomas Mathews	Louis Alonzo Turner
Harvey Jackson Hampton	Chester Montgomery Mears	Coy R. Watford
Ernest O. Ham	Edgar Lee Mitchell	Julius Stephens Wells
Buford Davis Hancock	Charles Guy Mixson	Alonzo Little Whitehead
Joseph Lee Harrison	James Gordon Mizell	Marion Sanders Whitehead
William Benjamin Henderson	Gren Austin Oliver	Claud H. Woodbury

WASHINGTON UNIVERSITY DENTAL SCHOOL.

THE annual commencement exercises of Washington University Dental School were held in Memorial Hall, Friday, May 21, 1909.

An address was delivered by Rev. Samuel Sale.

The degree of Doctor of Dental Surgery was conferred by Chancellor David Franklin Houston, on the following graduates:

Carlton Leona Agee	Arkansas	Shakespeare Longfellow Humphry	Arkansas
Alexander George Bolm	Missouri	Nathan Leivy	Illinois
Carl Cunningham	Illinois	John Everett Ligon	Missouri
Hal Speed Daniel	Missouri	Edward Martin Lottes	Missouri
Newton Marion Eldridge	Illinois	Shiro Miyake	Japan
Albert Ernst Fick	Missouri	Phares Annon Roberts	Texas
Bernhardt Washington Follenius	Missouri	Urling Cay Ruckstuhl	Missouri
William Alexander Griffis	Texas	Frank George Smith	Missouri
Frank Erwin Henselmeier	Missouri	Guy R. Stowell	Missouri
Harry Frederick Henselmeier	Missouri	William Francis Varin	Alabama
Arlando Orville Hollingsworth	Texas	Walter Virgil Vaughn	Illinois
Louis William Holtman	Missouri	William Von Hasselberg	Sweden

GEORGETOWN UNIVERSITY, DENTAL DEPARTMENT.

THE sixtieth annual commencement exercises of the Georgetown University, Dental Department, were held in Gaston Hall, Georgetown College, Washington, D. C., June 11, 1909.

An address to the graduates was delivered by Prof. D. Percy Hickling, M.D.

The degree of Doctor of Dental Surgery was conferred by Rev. Joseph Himmel, on the following graduate:

Thomas Joseph MayoockPennsylvania

CINCINNATI COLLEGE OF DENTAL SURGERY.

THE commencement exercises of the Cincinnati College of Dental Surgery, Dental Department of Ohio University, were held on Tuesday, May 11, 1909, at 8 o'clock P.M. in the rooms of the Business Men's Club in the Chamber of Commerce Building.

Remarks were made by G. S. Junkerman, A.M., M.D., D.D.S., dean, and by Dr. Alston Ellis, president of Ohio University at Athens, Ohio.

The degree of Doctor of Dental Surgery was conferred by Prof. E. W. Wilkin-son, president of the board of trustees, upon the following graduates:

A. Beagle	G. R. Deans	H. B. Huffman	H. D. Morris
F. M. Boyles	J. H. Gunkel	J. E. Ice	R. L. Thompson

UNIVERSITY OF CALIFORNIA, DENTAL DEPARTMENT.

THE annual commencement exercises of the University of California, Dental Department, were held in the Greek Theater, Berkeley, Cal., May 12, 1909.

The degree of Doctor of Dental Surgery was conferred by the president of the University on the following graduates:

Loren Amick Bagley	California	William Curran Hart	California
Mark Grover Bailey	California	James Cleveland McManus	California
David High Burson	California	Bernard Ralph Peters	California
Floyd Judson Collar	California	Francis Valentine Randol	California
Stanley Loftus Dod	Australia	Edward James Robinson	California
Donald William Forbes	California	Henry Elkan Rudee	California
Joseph Rosendo Galan	California	Arthur Lanark Thompson	California
Malcolm Goddard	California		

MEDICAL COLLEGE OF VIRGINIA, DENTAL DEPARTMENT.

THE annual commencement exercises of the Medical College of Virginia, Dental Department, were held May 19, 1909, in the Academy of Music, Richmond, Va.

An oration was delivered by Dr. George H. Denny, president of Washington and Lee University.

The degree of Doctor of Dental Surgery was conferred on the following graduates:

John Hubert Cocks	Charles Anderson Dodd	Charles Brown Pearson
Jesse Franklin Coltrane	James Baugh Mallory	Charles Davis Townes
Luther Lawrence Copenhaver	Thomas Ewell Payne	Frank Paul Turner
Cyrus Ochiltree Crank		

BARNES UNIVERSITY, DENTAL DEPARTMENT.

THE annual commencement exercises of the Dental Department of Barnes University were held in St. Louis, Mo., May 14, 1909.

The address to the graduates was delivered by W. F. Andrews, D.D.

The degree of Doctor of Dental Surgery was conferred on the following graduates:

Wash B. Johnson	Missouri	John A. Taylor	Illinois
George Ora Newton	New York	Wilbur Austin Walling	Missouri

COLLEGE OF PHYSICIANS AND SURGEONS.

THE thirteenth annual commencement exercises of the College of Physicians and Surgeons were held May 19, 1909, at the Golden Gate Commandery.

The oration was delivered by Hon. S. D. Woods.

The degree of Doctor of Dental Surgery was conferred on the following graduates:

James William Dollin	Carl Mearl Kilburn	Macklin Elliott Rives
Sadi Bernard Fontaine	Will Arthur Low	Bernhardt Rosen

NEW ORLEANS COLLEGE OF DENTISTRY.

THE annual commencement exercises of New Orleans College of Dentistry were held May 18, 1909, in the Tulane Theater, New Orleans, La.

The annual oration was delivered by Prof. Morton A. Aldrich, Ph.D.

The degree of Doctor of Dental Surgery was conferred by Dr. E. D. Craighead, president of Tulane University, on the following graduates:

Noland A. Bourgeois	Bertney G. Frick	Woodson W. Montfort	Arthur G. Root
Mark O. Carey	John T. Gibbons	William X. Moseley	Bussy A. Soleau
James F. Carter	Wells Healey	Clinton D. Pollard	Louis J. Stumpf
Rene L. Estopinal	Denis C. Herbert	Lycurgus P. Portis	G. Norbert Weiss
James J. Farrier	Donies E. Magee		

INDIANA DENTAL COLLEGE.

THE thirtieth annual commencement exercises of Indiana Dental College were held at Caleb Mills Hall, Indianapolis, at 8 P.M., Tuesday, May 25, 1909.

The degree of Doctor of Dental Surgery was conferred on the following graduates:

J. F. Applewhite	W. E. Garritson	J. H. Kraning	E. F. Riddell
Harley Bish	S. J. Grossnickle	J. Kreutzer	P. J. Ritchie
E. H. Blake	J. H. Hardwicke	R. N. Luse	G. W. Rodger
F. B. Bridges	Victor Hilgeman	W. L. McMurray	Pearl Russell
J. L. Brown	F. E. Hill	Carl Magussen	F. W. Seidel
Inlow Burton	O. E. Hite	Edw. Martin	Geo. J. Smith
H. G. Cain	R. H. Hopkins	Harry Mayer	H. Stephens
J. R. Carnahan	R. M. Hubbard	C. A. Meeks	H. C. Tolliver
H. W. Cawley	Douglas Hunter	D. W. Montgomery	G. E. Weir
I. M. Coogle	E. M. Hurst	C. E. Morgan	W. J. Wilson
Walter Cowan	C. T. Johns	E. C. Oberdurf	W. W. Woodrum
C. W. Doyel	A. R. Killian	R. H. Richardson	E. E. Young
J. K. Duff			

NORTH PACIFIC DENTAL COLLEGE.

THE annual commencement exercises of the North Pacific Dental College were held in Portland, Ore., Friday, May 21, 1909.

Addresses were delivered by Dr. James R. Cardwell and Dr. James F. Bell.

The degree of Doctor of Dental Medicine was conferred by Dr. Robert C. Yenney on the following graduates:

William Cox Allen	William Krassig	Leon D. Noble
Charles Raymond Bennett	Roy Niles Leezer	Hubert Frank Parsons
Robert Burdette Brandon	Albert Gay McKeown	Henry Bernhard Pederson
Clarence Albert Eldriedge	Howard Morgan McKinley	Cloan Norris Perkins
Jasper Ward Finley	Charles Hibbert McLeod	John Chandos Reasoner
Guy Nimrod Ford	Charles Musgrave MacNaughton	Mark Rosler
Philo Ferrier Green	Clifton Everett Moore	Folkert Nicholas Sickenga
Henry James Henderson	John Edmund Moulton	Frank Upton Spaulding
Ross Harvey Hoskins	Frederick Arthur Multhauf	Maude Muller Tanner
James Harvey Johnson	Oscar Edwin Nelson	George Prescott Wright
Robert Sidney Kademan		

ST. LOUIS DENTAL COLLEGE.

THE eighteenth annual commencement exercises of St. Louis Dental College were held in St. Louis, Mo., on Saturday, May 22, 1909.

The commencement address was delivered by John B. Deaver, M.D., of Philadelphia.

The degree of Doctor of Dental Surgery was conferred on the following graduates:

Rosecoe C. Bell	Illinois	Henry A. Jacobi	Missouri
Michael Byrne	New York	Francis P. Mahon	Missouri
Thomas P. Clarke	Iowa	Byron R. Mason	Missouri
J. R. Conklin	Kansas	Walter E. Pearl	Missouri
C. A. R. Dames	Missouri	Emmett M. Pitts	Missouri
Leopold De la Vega	Mexico	Jesse R. Robinson	Illinois
Patrick J. Donnelly	Kansas	Ernest W. Schriever	Missouri
Harold J. Dresser	Illinois	Walter H. Stallcup	Texas
Ralph T. Gerak	Missouri	Edmund C. Tessman	Minnesota

BALTIMORE MEDICAL COLLEGE, DENTAL DEPARTMENT.

THE twenty-eighth annual commencement exercises of the Dental Department of Baltimore Medical College were held in the Academy of Music, Baltimore, Md., May 25, 1909.

The degree of Doctor of Dental Surgery was conferred by Prof. S. K. Merriek, M.D., on the following graduates:

John Elmo Auer	Maryland	Charles Jacob Hien	Rhode Island
Norman H. Baker	New York	Burton Charles Leslie	New York
Claudius Gordon Baker	South Carolina	Lawrence Patrick McGovern	Massachusetts
Max W. Belzer	Connecticut	F. X. Ulderic Masse	Massachusetts
Fred. Earle Burden	New Brunswick	Richard Grover Miller	Virginia
Jesse J. H. Cather	West Virginia	William Henry V. Miller	New York
Christodulo Constantine	Ecuador, So. Am.	Harry William Mitten	Maryland
Raymond Joseph Couture	Connecticut	Russel Burton Randolph	West Virginia
Israel Danker	Maryland	John W. Robinson	Virginia
P. Alexander de Marconay	California	Cornelius Joseph Ryan	Connecticut
Walter Henry Desforges	Rhode Island	George Henry Samuel	New York
Edward Francis Gill	Rhode Island	Charles Edwin Sherwood	Massachusetts
Carroll Hartley Grune	Virginia	Joseph Parnell Stanley	Massachusetts
William Francis Hayes	Massachusetts	Francis Thomas Stenson	Vermont
Francis A. Heffernan	Rhode Island	Harry Elmin Tyler	New York

LINCOLN DENTAL COLLEGE.

THE annual commencement exercises of Lincoln Dental College were held May 27, 1909.

The degree of Doctor of Dental Surgery was conferred on the following graduates:

Jasper Freeman Cole	William Ray Gibson	Ralph Waldo Ludwick
Gladstone Derby	Ferdinand Griess	Elza Walter Parmentier
Charles Jesse Eller	Burl Gast Hancock	Frederic William Webster

COLORADO COLLEGE OF DENTAL SURGERY.

THE annual commencement exercises of the Colorado College of Dental Surgery were held in the Trinity Methodist Episcopal Church, Denver, Colo., Thursday, May 27, 1909.

The degree of Doctor of Dental Surgery was conferred on the following graduates:

Wm. C. Bailey	Lucian Grace	J. C. Martincourt	A. G. Oudkirk
Wm. R. Brown	J. M. Hardin	John W. Meehan	H. E. Sater
Clyde H. Coover	R. C. Hughes	H. C. Meyers	B. G. Saville
Arthur G. Cox	Jessie Hunter	J. J. Morgan	W. J. Scoggin
G. H. Crary	R. E. McKenzie	A. J. Murray	Fred L. Scott
M. A. Gates	A. W. Martin		

UNIVERSITY OF MARYLAND, DENTAL DEPARTMENT.

THE annual commencement exercises of the University of Maryland, Dental Department, were held at the Academy of Music, Baltimore, Md., May 31, 1909.

An address was delivered by John Allan Wyeth, M.D., LL.D.

The degree of Doctor of Dental Surgery was conferred on the following graduates:

John Frederick Anderson ...	North Carolina	Elmo N. Lawrence	North Carolina
Edward H. Bachman	Maryland	Samuel M. Long	Georgia
Arthur Bereston	Maryland	George M. Lowman	West Virginia
Lester G. Bryner	Pennsylvania	Nathan P. Maddux	Virginia
Roy A. Buhrman	Maryland	John Sylvester Mandigo	New York
William D. Y. Cahill	Virginia	Thomas McDonald	New York
Cristobal Julian Caraballo ...	Florida	Mason Walton Mangold	New Jersey
Seaford J. Carter	Georgia	Stanley A. Mendez	Jamaica
W. Arthur Charron	Massachusetts	Joseph F. Metz	Maryland
Julius M. Cornell	Connecticut	Max Meyerson	New York
Joseph A. Daudelin	Massachusetts	Georgiana Palmer Monks ...	Pennsylvania
J. Vernon Davis	North Carolina	Oscar L. Moore	North Carolina
Arthur Henry Dobbin	New York	Ellis Nordin	Maryland
Aubrey Donkin Durling	Nova Scotia	John Joseph O'Neill	Pennsylvania
Benjamin B. Edmunds	Virginia	John McCollugh Pagan	South Carolina
J. Randolph Gambill	Virginia	Thomas Meritt Pendexter ...	Massachusetts
Abraham Ganzburg	Massachusetts	E. Fitzroy Phillips	Jamaica
Henry Scott Gardner	West Virginia	Charles Jasper Price	Maryland
William Wallace Grant	West Virginia	Colbert L. Robbins	North Carolina
Arthur Horace Gravel	Massachusetts	Farris Sinham Sawaya	Syria
Charles Francis Hayes	Massachusetts	Maximillian Theo. Sendtner .	New York
John M. Herr	Pennsylvania	Edward J. Shortell	New Jersey
Harry Wilbur Hicks	Massachusetts	C. Alfred Shreeve	Maryland
Ernest Hudson Hopkins	North Carolina	Paul Steiner	Maryland
Charles Ray Hull	New York	William E. Van Brunt	Florida
Charles LaFayette Hutchison	Virginia	Fred. Van Zandt	New York
Albert Jefferson	Georgia	David Albertus Weinberg ...	South Carolina
H. Kneee Johnson	North Carolina	George F. Whitfield	North Carolina
John Robert Jordan	Georgia	John H. Williams	Maryland
Albert J. Kosminsky	Texas	Elzie J. Yelvington	Florida
Alexander P. Larimer	Pennsylvania		

WISCONSIN COLLEGE OF PHYSICIANS AND SURGEONS, DENTAL DEPARTMENT.

THE sixteenth annual commencement exercises of the Wisconsin College of Physicians and Surgeons, Dental Department, were held in Plymouth Church, Milwaukee, Wis., Thursday, May 27, 1909.

An address was delivered by Dr. Wilbur C. Carrier.

The degree of Doctor of Dental Surgery was conferred by Prof. A. Hamilton Levings on the following graduates:

Gilbert Anderson
Archie W. Downey
Ward L. Dunkirk

Frank B. Ernsperger
Birney Robert Getts
Benjamin Kailen

Carl A. Luenzmann
Edwin B. Weiss
Ewald Charles Wetzel

UNIVERSITY OF BUFFALO, DEPARTMENT OF DENTISTRY.

THE seventeenth annual commencement exercises of the University of Buffalo, Department of Dentistry, were held in the Teck Theater, Buffalo, N. Y., May 28, 1909.

An address was delivered by Dr. Adelbert Moot.

The degree of Doctor of Dental Surgery was conferred on the following graduates:

Arthur Walter Arnold
Arthur George Baitz
Leon Usher Bidwell
Harley Watson Black
Leo Dempsey Callahan
S. Judd Earley
Eugene Augustine Galvin

James Cleveland Gow
Henry Vosseler Heiss
Clarence Alvernon Hill
Charles Francis Hogan
Michael Kutyn
Edward Lewis

Maximus Lawrence Maxwell
Paul Archie McAlpin
Chelsea L. Storms
Russell Wilford Tench
Job Milton Ward
Irving Thomas Whalen

PHILADELPHIA DENTAL COLLEGE (TEMPLE UNIVERSITY).

THE annual commencement exercises of Philadelphia Dental College (Temple University) were held Saturday, June 5, 1909, in the Academy of Music, Philadelphia, Pa.

An address was delivered by Rev. Robert Stuart MacArthur, D.D.

The degree of Doctor of Dental Surgery was conferred by Russell H. Conwell, LL.D., on the following graduates:

Eugene Alling Connecticut
John F. Areson New Jersey
Ernst Baumann Switzerland
Joseph Bauman New Jersey
Charles F. Bowers Pennsylvania
C. S. Brouillet Massachusetts
Forrest U. Brown New York
J. D. Buckley Massachusetts
W. S. Carrick New Jersey
E. A. Chagnon Vermont
F. P. Clarke New York
J. L. Connell Massachusetts
E. J. Counihan Massachusetts
R. H. Cormack Scotland
Bernard DuBois New York
W. J. Eggleton Connecticut
R. Eisenhath Pennsylvania
B. S. Elliott Maine
J. H. Fagan Connecticut
Walther Fehlman Switzerland
C. A. Fiedler Pennsylvania
J. E. Gilda Pennsylvania
W. E. Green Connecticut
Max Hammerli Switzerland

Clarence L. Henderson Nova Scotia
T. C. Joseph Pennsylvania
Gilbert Kilduff Connecticut
M. A. Krasny Pennsylvania
M. H. Larrabee New York
R. H. LaRue New Jersey
Owen F. McCabe Connecticut
A. J. McCambridge Pennsylvania
Hans Matter Switzerland
Michael Mitchell New York
E. W. Morey Connecticut
D. W. Nutt New York
J. W. O'Connell Pennsylvania
M. A. O'Hara Connecticut
H. F. Oviatt Vermont
Stanley Palmateer New Jersey
M. H. Peck Connecticut
J. J. Roche Connecticut
A. W. Samson Pennsylvania
J. Silliker New Brunswick
S. D. Springer Maine
Alson L. Stone Pennsylvania
D. C. Turkington Connecticut
J. Whelan New York

PENNSYLVANIA COLLEGE OF DENTAL SURGERY.

THE fifty-third annual commencement exercises of the Pennsylvania College of Dental Surgery were held Tuesday, June 1, 1909, in the Broad Street Theater, Philadelphia, Pa.

An address to the graduates was delivered by Prof. J. Bird Moyer, B.S., Ph.D., D.D.S.

The degree of Doctor of Dental Surgery was conferred by I. Minis Hays, M.D., on the following graduates:

William Max Addelston	New York	Timothy Vincent McGeehan ..	Pennsylvania
Samuel Auerbach	Pennsylvania	John Melnicoff	Pennsylvania
Allen Spencer Bennett	Massachusetts	Samuel R. Mishkin	New York
Charles Leslie Blind	Pennsylvania	James Walter Miller	Pennsylvania
Adam L. L. Buddinger	Pennsylvania	William Thomas Morgan ..	Ohio
Arthur Sorin Cone	New Jersey	Albert Moses	Pennsylvania
Rudolph Cohn	Pennsylvania	Max Moskowitz	Germany
Henry H. Copper	South Carolina	James Norman Munro	Jamaica, B. W. I.
William Herbert Cruise	Australia	Samuel Nussblatt	New York
James Edward Cowlshaw ..	Connecticut	Ralph Eugene Palmer	Pennsylvania
Bernard R. Davidson	Pennsylvania	Max Pascher	New York
Meyer Harris Davis	New York	Frederick Preston Pierce ..	Pennsylvania
James Warren Deale	New York	Isidore Pekelman	New York
Adolph Gustav Dittmar	New Jersey	Hirsh Rosinoff	Russia
Anthony Jerome Dougherty ..	Pennsylvania	Quesada Joquin Saborio ...	Costa Rica
Samuel W. Ettelson	New Jersey	Arthur Pellew Salter	Canada
Oscar Erdreich	New York	Joseph S. Saunders	Pennsylvania
Morris M. Fintz	Pennsylvania	Warren George Sherwood ...	New York
Louis Gross	New Jersey	Isador S. Siris	New Jersey
Harry Happel	Pennsylvania	Arthur David Smith	Pennsylvania
Gaston Jung	Switzerland	Ernest Layton Smith	Pennsylvania
William Paul Kraft	Pennsylvania	Earle Albert Urwiler	Pennsylvania
Ernest Knapp Lee	New York	Evageline J. Vathy	Greece
Joseph J. Lerner	New York	William Taylor Walling ...	New Jersey
Frederick R. Lichtenwalner ..	Pennsylvania	Marcus Weintroh	New Jersey
John Ralph Long	Pennsylvania	Israel W. Weinberg	New Jersey
Francis Patrick McGinnis ...	Pennsylvania	Charles Weinberg	Pennsylvania

MEDICO-CHIRURGICAL COLLEGE, DENTAL DEPARTMENT.

THE annual commencement exercises of the Medico-Chirurgical College, Dental Department, were held Saturday, June 5, 1909.

The address was delivered by Hon. Chauncey Depew.

The degree of Doctor of Dental Surgery was conferred on the following graduates:

Andres Carcino Aguilar....	Cuba	Ross James Kelly	Pennsylvania
Véspaciano B. Aguilar	Nicaragua, C. A.	William H. McGrowty	Pennsylvania
Domingo Alvarez y Rivas....	Cuba	Fabio Paniagua	Guatemala, C. A.
Pedro Telmo Barba.....	Peru, S. A.	Harry Glenn Pollard	New York
Raymond Clyde Becker	Pennsylvania	Raymon C. Penton	Cuba
T. Aubrey Conley	Pennsylvania	Sebast. B. Romagosa y Perea.	Cuba
B. Wilber Creighton	New Jersey	Jose Rovelo y Arguello....	Mexico
William Feffer	Massachusetts	Albert Saifeld	Germany
Adolph C. V. C. Gaudron....	Paris, France	Philip Arthur Sandt	Pennsylvania
Alexander Gross	Austria	Delmar H. Stocker	Pennsylvania
Eugene Gottlieb	New York	Donald Archibald Thomas ..	Pennsylvania
Robert McCreedy Haury	Pennsylvania	Boni O. Tumin	Roumania
Lewis Clausen Henderson ..	Pennsylvania	Abel Uribe y Jaramillo....	Colombia, S. A.
John Charles Higgins	Pennsylvania	Oscar J. Vila	Cuba
John Anthony Hogan	Pennsylvania	J. B. S. Wick	Pennsylvania
Henry Clifton Kellogg	Massachusetts	Adolph H. Wise	New York

UNIVERSITY OF PENNSYLVANIA, DENTAL DEPARTMENT.

THE one hundred and fifty-third annual commencement exercises of the University of Pennsylvania were held at the American Academy of Music, Philadelphia, Pa., June 16, 1909.

An address was delivered by Josiah H. Penniman, Ph.D., LL.D.

The degree of Doctor of Dental Surgery was conferred on the following graduates:

Eduardo Acosta y O'Brien
Henry Kiver Allison
Joseph Elliott Andrews
Luis Raul Angulo
Samuel Freas Ashelman
George Egerton Balderston
Joseph James Barrett
Irvin Halsey Beach
Charles Wesley Beauchamp
Herbert Patrick Beckett
Harry LeRoy Billings
Theodor Blum
David Albert Bolard
Hendrik H. T. Ariè Bor
Rolla Jay Bristol
Frank William W. Broughton
Edward Leo Brown
William Allen Brown
Reginald Arthur Bull
Stuart Franklin Bushong
William Henry Calhoun
Luis de la Carrera
Gonzalo de la Cerda
Frank Augustus Chapman
William David Clifford
Clarence Roth Colborn
Henri Collard
Arthur Mantor Cragin
Lawrence Charles Crockett
John Hamilton Dalrymple
Harold Evans Davis
Charles Richard Dayton
Jacques Colin F. Demarquette
George Lancelot Deschler
Edmund Atwell Devine
Charles Henry Doran
Herman Ettenson
Niles Maxon Faulkner

James Francis Feely
William John Frost
Donald Lindsay Galbreath
John Joseph Gavin
Hubert George Gick
Ivar Charles Gingras
Ernest Emil Girard
Maurice Charles Girardin
Chester Nathaniel Gitt
Edward Carl Godfrey
Thomas Augustus Gormley
Earl Ellsworth Greenwell
Edward Henry Grosse
Gordon Melton Gunn
Harald Anders J. Hallander
Michael Benedict Harris
John Leon Hartranft
William John Heintz
Jerome Gross Hess
William Irving Hoot
William Henry Horahan
Herbert Vivian Hordern
Rollin Dewey Jenney
James Hoffer Johnson
John Watkins Jones
James Henry Keane
Carl Fred Keim
J. Craig King
Eugene Kienzle Krause
Joseph Kuttner
Jan Willem van Kuyk
Edwin George Lauder, Jr.
Lionel Jeffrey Llewellyn
Morton Joseph Loeb
Fabio Leite Loureiro
George Francis Madigan
Charles Augustus Mallon
Samuel Hugh Marron

Frank Marshall
James Carr Maslen
Israel Samuel Miller
Edwin Royle Morris
Karl Nachtigall
Lewis Edwin Neagley
Eugene John O'Curry
Joseph Ignatius O'Farrell
William Samuel Paine
Seymour Thomas Percival
Rollo Oliver Peters
Isaac Smedley Pike, Jr.
James Joseph Quigley
Rafael Robles, Jr.
William John Charles Ruempler
Glanville Kossuth Satchell
John William Scherer
Joseph Wilbur Scott
Paul Seitz
Arthur William Smith
Walter Cornell Smith
Norman Ray Snively
Samuel Sobel
Fulgence Lucien Solas
Paul Victor Soxhlet
Frederick Charles Stevens
William Denton Taylor
Edwin Spencer Tebbutt
Charles Edgar Wagg
Maynard Bruce Warburton
Sydney Stark Warner
George Alfred Wessner
Robert Lunsford Wheless
Thomas Lowry Wilcox
Charles Henry Wilkinson
William Jefferson Wilkinson
Edwin St. Clair Wren
Adolphe Zimmermann

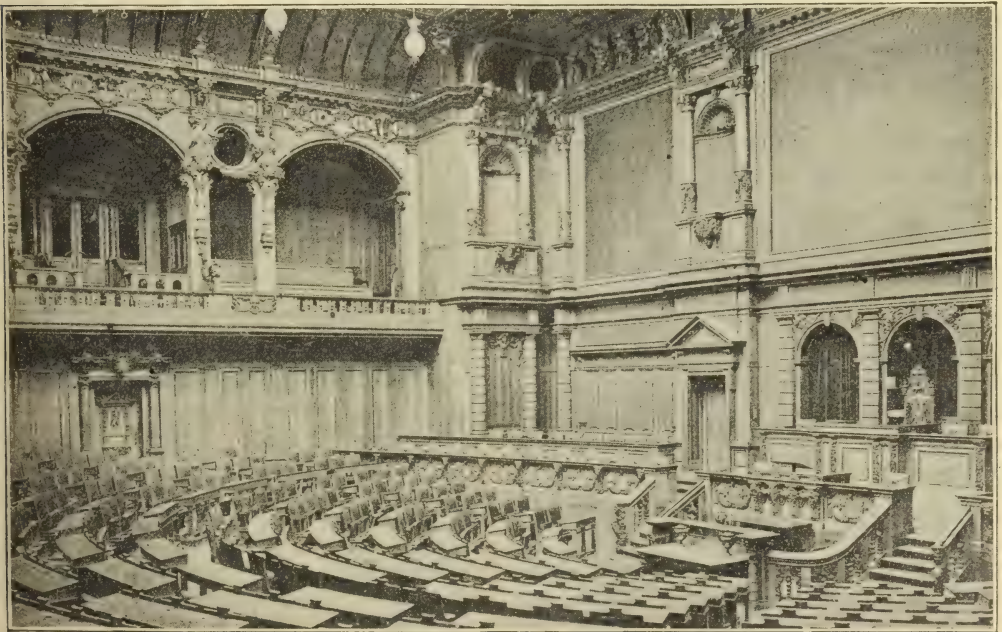
Fifth International Dental Congress.

Berlin, Germany, August 23 to 28, 1909.

OFFICIAL COMMUNICATION FROM THE COMMITTEE OF ORGANIZATION.

Invitation.

TO our colleagues of all nationalities we hereby extend a hearty invitation to participate in the FIFTH INTERNATIONAL DENTAL CONGRESS, to be held invited the congress to meet in Berlin in 1909, the German dentists were greatly pleased at the unanimous acceptance of their invitation.



GRAND ASSEMBLY-ROOM, REICHSTAG BUILDING, WHERE THE GENERAL SESSIONS OF THE CONGRESS WILL BE HELD.

in Berlin, August 23 to 28, 1909, in the Reichstag building.

When at St. Louis in the year 1904 the highly appreciated and respected Professor W. D. Miller, as president of the Central-Verein Deutscher Zahnärzte,

The congress will be coincident with the fiftieth anniversary of the Central-Verein Deutscher Zahnärzte. The united German dental profession is therefore preparing to worthily celebrate this occasion, and to make the theoretical and

practical results of this congress stand out as a landmark in the development of dental science.

Colleagues of all nations will combine, and in friendly rivalry giving and taking, learning and teaching, demonstrate to the educated world what great progress the science of dentistry has made in recent years.

Through well-attended meetings at which representatives of all nations will discuss theoretical and practical problems, dentistry will prove itself an independent science, worthy of being regarded as one of the numerous intellectual achievements of mankind.

The German Organization Committee, selected by the F. D. I., the Central-Verein, and the Vereinsbund, have completed their preparations, and now appeal to all colleagues, both at home and abroad, for their esteemed support.

The Reichstag building offers ample space for the meetings of the congress, which is divided into twelve sections. The Berlin Local Committee will do everything possible to entertain the visitors in the German metropolis during the time not occupied by more serious pursuits.

An International Dental Exhibition, to which the members are earnestly invited to contribute, will in the widest sense demonstrate the progress of our profession.

Honorary Presidents of the Congress are: Geheimer Medizinalrat Prof. Dr. Waldeyer; Wirklicher Geh. Ober-Reg.-Rat, Ministerialdirektor Dr. Naumann; Geheimer Ober-Medizinalrat Prof. Dr. Kirchner, and Geheimer Ober-Medicinalrat Dr. Dietrich of the Kultusministerium.

An Honorary Committee is also to be chosen.

The German Imperial Government has decided that the governments of the nations represented shall be officially informed of the meeting of the International Dental Congress in Berlin.

Besides the meetings of the individual sections, the congress will hold two general sessions. At these meetings time will be found not only for lecturers and demonstrations, but also for the discussion of subjects of general interest proposed by the chairmen of the sections. All progress in scientific, technical, and operative dentistry, as well as the subject and development of dental hygiene, will be presented by the ablest authorities.

A meeting of the F. D. I. will take place at the beginning and at the end of the congress.

Colleagues,—With your united support, may the great work succeed! The invitation is most heartily given by your German colleagues. With our united strength, let us guide our profession to still greater success, for the honor of science, for the benefit of mankind.

WALKOFF, *President*,
SCHAEFFER-STUCKERT,
Secretary-general,

COMMITTEE OF ORGANIZATION OF THE FIFTH
INTERNATIONAL DENTAL CONGRESS.

To the President of the National Committee of the United States of America for the Fifth International Dental Congress, Berlin, Dr. EDWARD C. KIRK, Philadelphia.

Dear Doctor,—I herewith beg to transmit through you the hearty invitation and preliminary program of the German colleagues to our American *confrères*. The Committee of Organization has been very happy to be informed of the constitution of the National Committee of the U. S. A., containing so many valuable and prominent men, and we hope that you will succeed in bringing about a participation of American dentists in the Berlin Congress as extensive as possible. We can assure you that the German colleagues will be happy to welcome their American brethren to Berlin, and that international science and international

collegiality will succeed in creating by means of this congress a work of high and important value.

To prevent misunderstandings we must explain that the Central-Verein Deutscher Zahnärzte being the body inviting to the congress, it has been necessary that all organization work and all financial and local questions shall be in charge of German graduates, but that we also heartily welcome those graduates of foreign countries residing in Germany as associate members with the same rights and privileges. I myself shall personally present the invitation to the congress to the American Dental Society of Europe at the time of their meeting in Wiesbaden, and I am convinced that the work of the congress as assisted by colleagues of all nationalities will be a great success.

Trusting to hear soon from you and awaiting with pleasant anticipations the participation of our American colleagues, I am, dear sir,

Yours truly,

SCHAEFFER-STUCKERT,
Secretary-general.

Communication from the Berlin Local Committee.

General Chairman, PROFESSOR GUTTMANN,
24 Kurfürstendamm, Berlin.

The object of the Berlin Local Committee is to make the sojourn of those visiting the congress as agreeable as possible.

In order to fully meet all requirements, the committee has decided to send out a list of questions relating to hotel accommodations, seats at the banquets and entertainments, and excursions and tours to German cities and universities. By returning the questions fully answered, at an early date, the Berlin Local Committee will be able fairly accurately to judge of the number of those intending to be present at the different entertainments, etc. This will facilitate the work of the committee and also give an opportunity of considering individual wishes.

Anyone desiring special information regarding matters within the province of the Local Committee should communicate with the general chairman, Professor Guttmann, 24 Kurfürstendamm, Berlin, or with the chairman of one of the sub-committees. So far, the following of these have been formed:

(1) *Entertainment Committee.* Chairman, Professor Guttmann, 24 Kurfürstendamm, Berlin.

(2) *Business Committee.* Chairman, Dr. Robert Richter, 23 Victoriastr., Berlin.

(3) *Committee on Inspection of the Scientific Institutions.* Chairman, Dr. Ritter, 94 Königgrätzerstr., Berlin.

(4) *Press Committee.* Chairman, Markuse, 12/13 Nettelbeckstr., Berlin.

(5) *Reception Committee.* Chairman, Willmer, Gr. Lichterfelde, Jungfernstieg 3.

(6) *Ladies' Committee.* Chairman, Guttmann, 71 Alexanderstr., Berlin.

(7) *Committee to procure the necessary apparatus for Lectures and Demonstrations.* Chairman, H. J. Mamlok, 143 Kurfürstenstr., Berlin.

(8) *Committee on Hotels and Accommodations.* Chairman, Pursche, 30 Rankestr., Berlin.

The Local Committee has made an arrangement with the Hamburg-American Packet Co., by which participants in the congress will receive, except during the height of the season, a considerable reduction of rates.

The Local Committee has been able to obtain the aid of a number of colleagues living in the larger cities of Germany, who are prepared to give advice and help to strangers visiting the congress. A list of these colleagues will be sent with the question blank.

Interpreters, distinguished by a special badge, who will be pleased to give their services, will be found in the office of the congress, at the meetings, entertainments, and on the excursions.

The official reception will be held in the Reichstag building. This magnificent and impressive structure is, above all others, a worthy meeting-place for serious scientific conventions. There is a sufficient number of rooms in this building for all sections to hold meetings simultaneously. The office will be established here several weeks before the beginning of the congress. A post-office

and telephone and telegraph stations in the building will be at the disposal of participants in the congress.

The Berlin Local Committee has undertaken to entertain the visitors during the congress. Arrangements have been made, giving visitors, during the time of the congress, free admission to the Zoölogical Garden and its concerts, as well as to the Landes-Ausstellungspark and the Annual Berlin Art Exhibition.

The City Council of Berlin has graciously promised a reception in the City-hall, on Monday evening, August 23d.

A banquet will be held on August 24th, in the hall of the Zoölogical Garden, to celebrate the fiftieth anniversary of the foundation of the Central-Verein Deutscher Zahnärzte.

For Wednesday, August 25th, no special entertainment has been provided, in order to allow each visitor to spend an evening as he prefers; nevertheless, a part of the Landes-Ausstellungspark (concert garden) will be specially reserved as a meeting-place for the participants in the congress.

Thursday evening, August 26th, the official banquet of the congress, followed by a ball, will be held in the Landes-Ausstellungspark.

For Friday, August 27th, afternoon and evening, the colleagues of Berlin and the Province of Brandenburg invite the participants in the congress to be their guests. In the afternoon a fleet of steamers, specially chartered, will make a trip through the scenically beautiful Havel Lakes. In the evening a banquet will be held at the Schwedischen Pavillon in Wannsee.

On Saturday, August 28th, an Abschiedstrunk (parting cup) takes place on the Terrassen am Halensee.

Excursions will be arranged to the environs of Berlin, as well as to various German cities and universities.*

The Local Committee will arrange that places and buildings of interest, as well as scientific institutions, can be visited and inspected with competent guides.

During the meetings the committee will arrange for the entertainment of the ladies accompanying the members of the congress.

All communications and items of interest will appear in the Daily Journal of the con-

gress, edited by Dr. Konrad Cohn. The perusal of this journal is therefore strongly recommended.

To the social functions, only those having tickets will be admitted. The price of these is 12 marks.

We hereby beg all colleagues to acquaint us as early as possible with their intention to visit the congress, and to send us a notification.

It is especially wished to obtain a list of lectures and demonstrations, also the number of visitors, at an early date; we beg that all notifications be sent at your very earliest convenience.

All questions regarding the journey and accommodations should be sent to the president of the Berlin Local Committee, Professor Guttman, Berlin, Kurfürstendamm 24.

All applications for membership should be forwarded to the National Committee in your own country, or direct to the secretary-general, Schaeffer-Stuckert, D.D.S., Kettenhofweg 29, Frankfurt a. M.

All inquiries regarding the exhibition should be sent to Prof. Dr. Dieck, Potsdamerstr. 113, Villa 3, Berlin.

Further information will be gladly given by the president, the secretary-general, or the secretary, Dr. Konrad Cohn, Potsdamerstr. 46, Berlin.

SCHAEFFER-STUCKERT, *Secretary-general*,

COMMITTEE OF ORGANIZATION OF THE FIFTH
INTERNATIONAL DENTAL CONGRESS.

Regulations of the Fifth International Dental Congress.

(1) The Fifth International Dental Congress will be held in Berlin, from August 23 to 28, 1909.

(2) The congress will be devoted to the scientific and technical progress of dentistry, and to the general interests of the dental profession.

The congress is composed of the following sections:

SECTION I: Anatomy, Physiology, and Histology. *Chairman*, Dr. Adloff, Königsberg i. Pr., Weissgerberstr. 6-7.

SECTION II: Pathology and Bacteriology. *Chairman*, Prof. Dr. Römer, Strassburg i. E., Universitätsplatz 1.

* We have received an official invitation from the city council of Darmstadt, and expect similar invitations from Cologne and Frankfurt a. M.

SECTION III: Chemistry, Physics, and Metallurgy. *Chairman*, C. Birgfeld, Hamburg, Alsterdamm 1.

SECTION IV: Diagnosis and Special Therapeutics; Materia Medica: *Chairman*, Prof. Dr. Michel, Würzburg, Wilhelmstr. 3.

SECTION V: Oral Surgery and Surgical Prosthesis. *Chairman*, Geheimrat Prof. Dr. Partsch, Breslau, Kaiser-Wilhelmstr. 3; Prof. Dr. Schröder, Berlin, Rankestr. 27.

SECTION VI: General and Local Anesthesia. *Chairman*, University Lecturer Dr. Fischer, Greifswald.

SECTION VII: Operative Dentistry. *Chairman*, Prof. Dr. Sachs, Berlin, Kurfürstendamm 247.

SECTION VIII: Prosthetic Dentistry, including Crown and Bridge Work; Ceramics. *Chairman*, Prof. Dr. Riegner, Breslau, Museumstr. 11.

SECTION IX: Orthodontia. *Chairman*, Hofzahnarzt Heydenhauss, M.D., Berlin, Potsdamerstr. 121a.

SECTION X: Hygiene of the Mouth and Teeth. *Chairman*, Hofrat Dr. C. Röse, Dresden, Daheimstr. 12.

SECTION XI: Education and Legislation. *Chairman*, Dr. Ritter, Berlin, Königgrätzerstr. 94.

SECTION XII: History and Literature. *Chairman*, University Lecturer Dr. Hoffendahl, Berlin, Schöneberger Ufer 20.

(3) "Ordinary members" of the congress are: Graduated dentists, who possess the diploma of the country in which they practice, and instructors of dentistry in universities. "Associate members" of the congress are: (a) Physicians; (b) foreigners, who do not possess the diploma of the country in which they reside. (The eligibility of persons not here provided for will be decided by the national committees; for Germany, by the Committee of Organization.) "Participants" are relatives of the members of the congress, and students of dentistry. Ordinary and associate members have equal rights.

(4) Applications for membership are to be sent to the national committees (in Germany, to the Organization Committee), together with name and address, and the fee of 25 marks. For relatives of the members of the congress, as well as for students, the charge for admission cards will be 10 marks.

(5) For admittance to the congress, a card bearing the name of the member, as well as a receipt for the dues paid, is necessary.

Visitors at the congress will receive the Daily Journal of the congress and the catalog of the exhibition. Ordinary and associate members receive the Transactions of the Congress, gratis.

Lectures and demonstrations can be given by members only.

(6) The congress will convene in the Reichstag building.

(7) German, English, and French are the official languages of the congress; other languages may be used with the consent of the chairman of the section.

(8) The congress will hold a general opening session (Monday, August 23, 1909), a general session (Thursday, August 26th), and a closing session (Saturday, August 28th). There will be sessions of individual sections, as well as meetings of several sections together. Discussions will not take place at the opening session.

(9) Those wishing to give lectures, demonstrations, etc., should notify the chairman of the section, before May 15, 1909. Notices sent in after that date can be considered only after the program has been arranged. Should circumstances permit of more papers being read, the chairman has a right to select from those sent in after May 15th. It is advisable to let the national committees send in all contributions, etc., to the chairmen of the different sections.

(10) All lectures, etc., are to be delivered ready for printing in the language in which they are to be given, with a summary of the most important points, to the chairman of the section not later than June 15, 1909. This summary will be translated by the management and placed before the members of the section.

(11) Notice of practical demonstrations should be given to the chairman of the section as soon as possible, together with a list of accessories necessary for the demonstration. A short account of the purpose of the demonstration should be sent to the chairman before June 15, 1909. This account will be translated, and communicated to the members of the congress.

(12) The time at the disposal of a lecturer is fixed at twenty minutes; five minutes will

be allowed for speeches in the discussion. Extension of the time is left to the judgment of the chairman.

(13) Those taking part in the discussions should immediately note their remarks on a printed form, and give it to the secretary, if they wish their views to be published in the Transactions of the Congress.

(14) A pass for the various social functions will be issued at the price of 12 marks.

(15) There will be an International Dental Exhibition connected with the congress.

PROVISIONAL PROGRAM.

The following provisional program has been arranged:

SUNDAY, August 22d.

Meeting of the Fédération Dentaire Internationale. Evening: Reception of the guests at the Reichstagsgebäude.

MONDAY, August 23d.

Morning: Opening session. After the official address of welcome, four orators (German, English, French, and American) will speak on subjects chosen by themselves and important for the entire profession. The National Committees of the respective countries have each been requested to nominate their orator.

Evening: Reception given by the City of Berlin at City Hall.

TUESDAY, August 24th.

9 A.M.—2 P.M.: Sessions of the Sections.

Evening: Banquet in the halls of the Zoölogical Gardens.

WEDNESDAY, August 25th.

9 A.M.—2 P.M.: Sessions of the Sections.

Evening: Fiftieth anniversary of the Central Verein Deutscher Zahnärzte (Central Association of German Dentists) in the halls of the Rheingold.

THURSDAY, August 26th.

Second general session in the great hall of the Reichstagsgebäude. Subjects and questions will be discussed by speakers appointed by the different countries.

Evening—at the disposal of the congressists.

FRIDAY, August 27th.

9 A.M.—2 P.M.: Sessions of the Sections.

Evening: Reception in honor of the congressists given by the *confrères* of Berlin and of the province of Brandenburg.

Special train to Wannsee.

SATURDAY, August 28th.

9 A.M.—12 M.: Sessions of the Sections (passing of resolutions) and meeting of the Fédération Dentaire Internationale.

3 P.M.: Closing session. Adoption of the resolutions of the Congress.

Evening: Farewell banquet at the Halensee Terraces.

On Sunday and after, groups of the congressists will visit German cities and universities.

INTERNATIONAL EXHIBITION OF DENTAL SCIENCE.

In connection with the Fifth International Dental Congress in Berlin, August 23–28, 1909, an International Exhibition of Dental Science will be arranged, on a large scale, in the Reichstag building.

The progress of dentistry in all civilized countries cannot be better illustrated than by means of a systematically arranged scientific exhibition.

The nature and extent of the proposed exhibition is evident from the following grouping:

GROUPS OF EXHIBITS.

I. Anatomy and physiology.

1. Comparative anatomy. (a) Anthropology and ethnology. (b) Comparative odontology including paleontology. (c) Anomalies of the teeth of animals.

2. Normal macroscopical anatomy of man (anatomy and development of the head, jaws, and teeth, including specimens of the jaws and teeth).

3. Normal microscopical anatomy.

4. Anomalies of anatomical development (anomalies of the development of the head, jaws, and teeth).

5. Physiology.

II. Pathology and bacteriology.

1. General pathology.
2. Special macroscopical pathology, including comparative pathology.
3. Special microscopical pathology.
4. Bacteriology of the mouth.

III. Surgery of the mouth and the jaws.

1. Surgical therapeutics, including narcosis and local anesthesia.
2. Surgical prosthesis, including obturators.

IV. Orthodontia.**V. Preservative treatment of the teeth.**

1. Fillings. 2. Root-treatment.

VI. Prosthetic dentistry.

1. Plate work. 2. Crown and bridge work, including ceramics.

VII. Photography in dental surgery as a means of investigation and instruction.

1. Macroscopic photography. 2. Microscopic photography. 3. Stereoscopy. 4. X-ray photography. 5. Photography in colors.

VIII. General dental education, post-graduate instruction, educational appliances.**IX. Hygiene of the mouth and the teeth.**

- (a) From the scientific, and (b) from the sociological point of view.

X. History of dentistry.

Instruments, pictures, and in short, everything of historical interest for dentistry.

XI. Dental jurisprudence.**XII. Literature.**

- (a) Original works. (b) Periodicals.

The committee desires to be informed of the names of all public or private collections containing specimens of general or special interest for dentistry.

The committee of the exhibition urgently requests each to use his personal influence to arouse interest in behalf of the International Dental Exhibition.

The committee will take every possible precaution to insure the safety of any specimens loaned.

Prof. Dr. DIECK,

Chairman Committee on Exhibits,
Berlin, Potsdamerstr. 113, Villa 3.

**AMERICAN NATIONAL COMMITTEE FOR
THE FIFTH INTERNATIONAL DENTAL
CONGRESS.**

At a meeting of the Executive Council of the National Dental Association held at Pittsburg, Pa., Saturday, October 10, 1908, the following were appointed as the American National Committee, to forward the work of the Fifth International Congress and provide for the representation of American dentistry at that congress—to be held in Berlin, Ger., August 23 to 28, 1909:

American National Committee.

Edward C. Kirk, Philadelphia, Pa., *Ch'man.*
Burton Lee Thorpe, St. Louis, Mo., *Sec'y.*
Truman W. Brophy, Chicago, Ill.
S. H. Guilford, Philadelphia, Pa.
B. Holly Smith, Baltimore, Md.
G. E. Savage, Worcester, Mass.
Wm. Carr, New York, N. Y.
W. W. Walker, New York, N. Y.
J. D. Patterson, Kansas City, Mo.
Gordon White, Nashville, Tenn.
Chas. R. Turner, Philadelphia, Pa.
Chas. McManus, Hartford, Conn.
G. V. I. Brown, Milwaukee, Wis.
N. S. Hoff, Ann Arbor, Mich.
F. E. Ball, Fargo, N. Dak.
L. P. Dotterer, Charleston, S. C.
Eugene H. Smith, Boston, Mass.
Chas. L. Alexander, Charlotte, N. C.

COMMITTEE ON ESSAYS.

Edward C. Kirk, *Chairman.*
Burton Lee Thorpe, *Secretary.*
L. P. Dotterer.

COMMITTEE ON CLINICS.

Wm. Carr, *Chairman.*
J. D. Patterson, *Secretary.*
Chas. L. Alexander.

All Americans who expect to attend the congress are requested to send their names, with the title of their essay or clinic, to the secretary of the American National Committee at once.

BURTON LEE THORPE, *Sec'y.*
3605 Lindell Blvd., St. Louis, Mo.

SOCIETY NOTES AND ANNOUNCEMENTS.

DENTAL SOCIETY MEETINGS: July and August.

JULY.

CALIFORNIA STATE DENTAL ASSOCIATION AND THE ALUMNI ASSOCIATION OF THE COLLEGE OF DENTISTRY, UNIV. CAL. San Francisco. Three days: July 6th to 8th.

COLORADO STATE DENTAL ASSOCIATION. Colorado Springs. July 12th to 14th.

DELTA SIGMA DELTA FRATERNITY. Seattle. Three days: July 21st to 23d.

NEW JERSEY STATE DENTAL SOCIETY. Asbury Park. Three days: July 22d to 24th.

OREGON STATE DENTAL ASSOCIATION. Portland. Three days: July 12th to 14th.

VIRGINIA STATE DENTAL ASSOCIATION. Fortress Monroe. Three days: July 21st to 23d.

WASHINGTON STATE DENTAL SOCIETY. Seattle. Three days: July 15th to 17th.

WISCONSIN STATE DENTAL SOCIETY. Milwaukee. Three days: July 13th to 15th.

AUGUST.

FIFTH INTERNATIONAL DENTAL CONGRESS. Berlin, Germany. August 23d to 28th.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS. Old Point Comfort, Va. Three days: August 2d to 4th.

NATIONAL ASSOCIATION OF DENTAL FACULTIES. Old Point Comfort, Va. Three days: August 2d to 4th.

Examiners' Meetings.

DISTRICT OF COLUMBIA BOARD OF EXAMINERS. Washington. July 1st to 3d.

HAWAII BOARD OF EXAMINERS. Honolulu. July 24th.

NEW JERSEY BOARD OF EXAMINERS. Trenton. July 6th to 8th.

SOUTH DAKOTA BOARD OF EXAMINERS. Sioux Falls. July 13th to 15th.

VERMONT BOARD OF EXAMINERS. Montpelier. July 13th to 15th.

WYOMING BOARD OF EXAMINERS. Cheyenne. July 5th to 7th.

AMERICAN SOCIETY OF ORTHODONTISTS.

THE ninth annual meeting of the American Society of Orthodontists will be held in Cleveland, Ohio, on Monday, Tuesday, and Wednesday, October 4, 5, and 6, 1909.

FREDERICK C. KEMPLE, *Sec'y*,
43 W. 48th st., New York city.

NATIONAL ASSOCIATION OF DENTAL FACULTIES.

THE National Association of Dental Faculties will hold their annual meeting in connection with the National Association of Dental Examiners in the Hotel Chamberlin, Old Point Comfort, Va., August 2, 3, and 4, 1909, commencing at 10 A.M.

Rates will be the same as the National Association of Dental Examiners. Railroad and steamship rates will be given at a later date.

B. HOLLY SMITH, *Chairman Ex. Com.*,
Baltimore, Md.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

THE twenty-seventh annual meeting of the National Association of Dental Examiners will be held at the Hotel Chamberlin, Old Point Comfort, Va., the first session opening at 10 o'clock A.M., Monday, August 2, 1909, and continuing during the 3d and 4th.

The result of the mail vote by the committee to ascertain the consensus of opinion as to place and date, from October 19th to the present date, was ninety-one votes for Old Point Comfort the first three days of August, thirteen for Birmingham in March, seven for Birmingham in July; the president has therefore selected Old Point Comfort.

The rates will be: American plan \$3.00 per day without bath and \$4.00 per day with bath. Large and commodious meeting-rooms

will be furnished free. Railroad and steamship rates will be furnished at a later date.

CHAS. A. MEEKER, *Sec'y*,
Newark, N. J.

N. A. D. E. AND N. A. D. F. BANQUET.

THE first annual banquet of the National Association of Dental Examiners and the National Association of Dental Faculties will be held at the Hotel Chamberlin, Old Point Comfort, Va., either on Sunday or Monday evening, August 1st or 2d; the evening will be decided later by the committee in charge. This pleasing innovation inaugurated by these two great associations will tend to make new and old members better acquainted.

President Shotwell of the Examiners Association has appointed Dr. George E. Mitchell of Haverhill, Mass., Dr. Charles A. Meeker of Newark, N. J., and Dr. H. W. Campbell of Suffolk, Va.; and Dr. B. Holly Smith of Baltimore, Md., chairman of the Executive Committee of the Faculties Association, has appointed Dr. Edward W. Branagan of Boston, Mass., Dr. A. R. Starr of New York city, and Dr. F. W. Stiff of Richmond, Va., to act in conjunction in making arrangements for the success of the banquet.

CHAS. A. MEEKER, *Sec'y* N. A. D. E.

DAVISS CO. (KY.) DENTAL SOCIETY.

THE dentists of Owensboro, Ky., have organized the Daviess County Dental Society. The object of the organization will be to promote social intercourse, good feeling, and mutual improvement in modern dentistry in all its phases, that the public interests may be best served.

The beginning is certainly most favorable, as we have almost the entire number of resident dentists of the city as members, and already there is an era of good feeling never known before. It is very probable that the local society will become a part of the state association.

The following officers have been elected: W. B. Armendt, president; R. E. Morrison, vice-president; Gordon L. Burke, secretary and treasurer.

GORDON L. BURKE, *Sec'y*.

NEW JERSEY STATE DENTAL SOCIETY.

THE New Jersey State Dental Society will hold their annual meeting in the Casino, situated on the beach front at Asbury Park, N. J., beginning Wednesday, July 22d, and continuing through the 23d and 24th.

The clinics and exhibits are so large and varied that it has been necessary to secure a large building to accommodate them and the many visitors to the meetings. The Casino is ideally situated, large and cool and well adapted for dental meetings.

The Hotel Columbia has been selected as headquarters for the society, and it offers superior accommodations and low rates for those desiring to attend the meeting. All the principal railroads lead to Asbury Park, with many trains daily, also boat connections to New York for those desiring to travel by water.

All the dental profession should mark off the above dates and spend a delightful three days' vacation attending our meeting.

CHAS. A. MEEKER, *Sec'y*,
29 Fulton st., Newark, N. J.

CALIFORNIA STATE DENTAL ASSOCIATION

AND THE

ALUMNI ASSOCIATION OF THE COLLEGE OF DENTISTRY, UNIV. CAL.

THE California State Dental Association and the Alumni Association, College of Dentistry, University of California, will hold a joint meeting on July 6, 7, and 8, 1909, at the College building, Second and Parnassus aves., San Francisco.

Dr. John Q. Byram of Indianapolis and Dr. Weston A. Price of Cleveland will participate—which is a guarantee of a first-class meeting.

Manufacturers are being solicited to make exhibits and inasmuch as there will be a series of meetings on the Coast from June 28th to July 23d, it is expected that exhibitors will find it to their advantage to make the circuit.

Reserve these three days for a most profitable meeting; the knowledge gained will amply repay you.

ROBERT E. KEYS,
Com. on Publicity.

MARYLAND STATE DENTAL ASSOCIATION

AND THE

DISTRICT OF COLUMBIA DENTAL SOCIETY.

A JOINT meeting of the Maryland State Dental Association and the District of Columbia Dental Society will be held in Washington, D. C., October 28 to 30, 1909.

For further information address either of the following:

F. F. DREW,
701 Howard st., Baltimore, Md.
A. D. WEAKLEY,
Washington, D. C.

ILLINOIS STATE DENTAL SOCIETY.

At the forty-fifth annual meeting of the Illinois State Dental Society, held in Danville, May 11 to 14, 1909, the following officers were elected: E. H. Allen, Freeport, president; C. C. Corbett, Edwardsville, vice-president; J. F. F. Waltz, Decatur, secretary; C. P. Pruyn, Chicago, treasurer; H. F. Lotz, Joliet, librarian.

The forty-sixth annual meeting will be held in Springfield, May 10 to 13, 1910.

J. F. F. WALTZ, *Sec'y*,
Decatur, Ill.

MISSOURI STATE DENTAL ASSOCIATION.

REORGANIZATION.

At the forty-fourth annual meeting of the Missouri State Dental Association, held at Kansas City, May 26, 27, and 28, 1909, a resolution was adopted to reorganize the association and re-district the state, and a committee was appointed to draft a new constitution.

The following officers were elected: R. E. Darby, Springfield, president; O. J. Fruth, St. Louis, first vice-president; C. C. Allen, Kansas City, second vice-president; J. F. Wallace, Canton, recording secretary; F. W. Patterson, Tipton, corresponding secretary; J. T. Fry, Moberly, treasurer.

The meeting next year will be held in St. Louis.

F. W. PATTERSON, *Cor. Sec'y*,
Tipton, Mo.

DELTA SIGMA DELTA FRATER- NITY

AT SEATTLE EXPOSITION.

THE Seattle Auxiliary wishes to announce the annual Supreme Chapter meeting of Delta Sigma Delta Fraternity in Seattle, on July 21, 22, and 23, 1909. July 24th will be "Delta Sigma Delta day" at the Alaska-Yukon-Pacific Exposition.

C. F. Fiset, *Historian*.

VIRGINIA STATE DENTAL ASSOCIATION.

THE fortieth annual session of the Virginia State Dental Association will be held at The Chamberlin, Fortress Monroe, Va., July 21, 22, and 23, 1909. Every effort is being made to make this the most interesting and successful meeting of our society. Men of national reputation will give clinics and read papers. All ethical practitioners are cordially invited to attend.

W. H. PEARSON, *Cor. Sec'y*,
Hampton, Va.

COLORADO STATE DENTAL ASSOCIATION.

THE twenty-third annual meeting of the Colorado State Dental Association will be held in Colorado Springs, July 12, 13, and 14, 1909. The meeting is held in July this year in order to enable Dr. G. V. Black to be with us.

All ethical dentists are invited to attend and take part in the program.

CHAS. A. MONROE, *Sec'y*,
1 Willard Blk., Boulder, Colo.

HAWAII BOARD OF EXAM- INERS.

THE Board of Dental Examiners for the territory of Hawaii will meet at Honolulu on July 24, 1909, for the examination of candidates to practice dentistry in this territory. All applicants must deposit a fee of twenty dollars and must be graduates of reputable dental colleges.

Copies of the dental law furnished on request.

C. B. HIGH, D.D.S., *Sec'y-Treas.*,
54 Young bldg., Honolulu, H. I.

SOUTH DAKOTA BOARD OF EXAMINERS.

THE next meeting of the South Dakota State Board of Dental Examiners will be held at Sioux Falls, S. D., July 13, 1909, beginning at 1.30 P.M. and continuing three days.

Both practical and written examinations will be required of all candidates, and all applications, together with the examination fee of twenty-five dollars, must positively be in the hands of the secretary not later than July 5th, otherwise they will not be admitted to examination.

G. W. COLLINS, Vermillion, S. D.

DISTRICT OF COLUMBIA DENTAL EXAMINERS.

THE next semi-annual examination of the Board of Dental Examiners of the District of Columbia will be held at the George Washington University, July 1, 2, and 3, 1909. All applications for examination must be accompanied by a fee of ten dollars, and filed with the secretary by June 22, 1909. For further information address

STARR PARSONS, M.D., D.D.S.,
1309 L st., N. W., Washington, D. C.

VERMONT BOARD OF DENTAL EXAMINERS.

THE next meeting of the Vermont Board of Dental Examiners for the examination of candidates to practice dentistry will be held at Montpelier, July 13 to 15, 1909.

Headquarters will be at the Pavilion Hotel. Application, together with fee, \$25, must positively be in the hands of the secretary before July 1st.

Application and other blanks required, including all information, can be had of

J. HOLMES JACKSON, *Sec'y*,
Burlington, Vt.

NEW JERSEY BOARD OF REGISTRATION.

THE New Jersey State Board of Registration and Examination in Dentistry will hold their semi-annual examination in the Assembly chamber of the State-house, Trenton, N. J., beginning Tuesday, July 6, 1909, and continuing through the 7th and 8th.

Practical examinations will be held on the

6th, theoretical examinations on the 7th and 8th. Practical work consists of soldering a gold or silver plate, one gold filling, and one amalgam filling. The gold filling must be an approximal one, with an approximating tooth in position.

Candidates are requested to bring their patients. Photograph and preliminary credentials must accompany the application. Sessions begin promptly at 8 A.M. each day.

Applications must be in hands of the secretary ten days prior to the examination.

CHARLES A. MEEKER, D.D.S., *Sec'y*,
29 Fulton st., Newark, N. J.

WYOMING BOARD OF EXAMINERS.

THE Wyoming State Board of Dental Examiners will hold a meeting for the purpose of examining applicants for license to practice dentistry, July 5, 6, and 7, 1909, at the Senate Chamber, Cheyenne, Wyo.

All applications for examination must be in the hands of the secretary, together with the fee of \$25, fifteen days before the examination. Applicants must be graduates from reputable dental colleges recognized by the National Association of Dental Faculties. For further information address

PETER APPEL, JR., *Sec'y*,
Cheyenne, Wyoming.

ARMY DENTAL CORPS.

MEMORANDUM of changes in stations and duties of dental surgeons, U. S. Army, for the month ending June 12, 1909:

Edwin P. Tignor: Relieved from temporary duty at Fort Monroe, Va., and further duty at Fort Adams, R. I., will proceed to Fort Slocum, N. Y., for duty.

Alden Carpenter: Relieved from temporary duty at Fort Slocum, N. Y., and ordered to return to his proper station, Fort Hancock, N. J.

Jean C. Whinnery: Left Fort Liscum, Alaska, and arrived at Fort William H. Seward, Alaska, for duty.

Emmett J. Craig: Left Fort Leavenworth, Kans., and arrived at Fort Omaha, Nebr., for duty.

Edward P. R. Ryan: Left Fort Leavenworth, Kans., and arrived at Fort Robinson, Nebr., for duty.

Robert H. Mills: Ordered to proceed from Monticello, Fla., to Fort Adams, R. I., for duty.

Frank L. K. LaFlamme: Ordered to proceed from Rumford, Maine, to Fort Thomas, Ky., for temporary duty, and upon completion, to Fort Sheridan, Ill., for duty.

Ralph W. Waddell: Contract annulled at his own request.

Samuel W. Hussey: Contract annulled at his own request.

EXAMINATIONS OF DENTISTS FOR THE ARMY.

THE Surgeon-general of the army announces that while there are no vacancies in the dental corps, he intends to hold examinations to establish an eligible list from which appointments will be made as vacancies occur.

Applicants for appointment as dental surgeons in the United States army will be authorized to present themselves at the nearest military post at which a commissioned officer

of the medical corps is stationed, for examination as to physical qualifications for employment, and those found physically qualified will be invited to report at West Point, N. Y., or San Francisco, California, about August 1909, for the professional examination. No allowance can be made for expenses incurred in undergoing these examinations.

Application blanks can be procured upon application to the Surgeon-general of the army. The essential requirements to securing an invitation are that the applicant shall be between twenty-four and thirty years of age, a graduate of a standard dental college, and shall be of good moral character and habits.

Army dentists are employed under a three years' contract at the rate of \$150 per month; are entitled to traveling allowances and suitable quarters; they have the privilege of purchase of supplies at the army commissary. The hours of official duty are from 9 A.M. to 4 P.M., although they are subject to emergency calls. During other hours they are permitted to treat persons not entitled to gratuitous services with their own materials.

UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING MAY 1909.

May 4.

- No. 920,265, to M. N. CALLENDER. Dental cuspidor.
No. 920,483, to A. P. LEE. Appliance for making dental castings.
No. 920,561, to E. M. FREDERICKS. Dental inlay casting machine.
No. 920,768, to F. W. MACDONALD. Artificial tooth.

May 11.

- No. 920,955, to SURN JACKSON. Means for administering air or gas.

- No. 921,015, to P. R. SKINNER. Root-canal-filling dental ejector.

May 18.

- No. 921,709, to W. M. JACKSON. Attachment for artificial teeth upon bridge work.
No. 921,791, to J. L. BENSON. Crown for teeth.
No. 922,331, to T. M. QUARLES. Hypodermic syringe.

May 25.

- No. 922,824, to T. A. TUBBS. Dental-floss holder.



DR. W. H. CHILSON.

THE DENTAL COSMOS.

VOL. LI.

AUGUST 1909.

No. 8.

ORIGINAL COMMUNICATIONS.

THE RESTORATION OF FACIAL EXPRESSION IN DENTAL PROSTHESIS.

By CHARLES R. TURNER, D.D.S., M.D., Philadelphia, Pa.

(Read before the District of Columbia Dental Society at its regular monthly meeting,
March 1909.)

THE necessity for the restoration of the contours of the face and the re-establishment of its expression after the loss of the teeth has probably done more to give dental prosthesis its art side than any other requirement imposed in the construction of artificial dentures. The fact, however, that it is too often made subservient to, instead of co-ordinate with, the necessity for providing the patient with a satisfactory masticatory appliance is to be regretted, and this paper is presented with the view of calling attention to some details of the methods employed in the accomplishment of the former of these two essential objects of artificial dentures. Some of the main facts of my argument have recently been presented in an informal talk to the Reading Dental Society, but the breadth of the subject and its importance would seem to justify their repetition here.

FACIAL EXPRESSION.

The face, anatomically speaking, is merely the collection of the features. In its area are concentrated several of the peripheral organs of the nerves of special sense, together with the mouth, which in addition exists as the beginning of the alimentary tract. Probably by reason of the fact that the organs of special sense are centered here and are in such close relation with the brain, as the individual grows and his life experience increases there is imparted to the face a certain cast or expression which is in keeping with and is largely the result of his thoughts and emotions. Every countenance has its characteristic expression. This expression has both an anatomical and a physiological basis. The first of these is the features themselves and their relationship, which of course is the result of

inheritance, that of race and of family. This is the natural physical endowment of the individual, and upon this becomes engrafted the physiologic basis, which is the result of the functioning of these features and their associated parts. The latter is largely if not wholly a question of the activities of the so-called muscles of expression, a group of superficial muscles usually described as being centered

sion which impart to the countenance its characteristic permanent cast. The process by which this is done may be simply understood. The muscles are very superficial, are intimately attached to the skin almost from their origin, and upon contracting throw the latter into folds and prominences. When these movements are frequently repeated they make a permanent impress upon the face

FIG. 1.

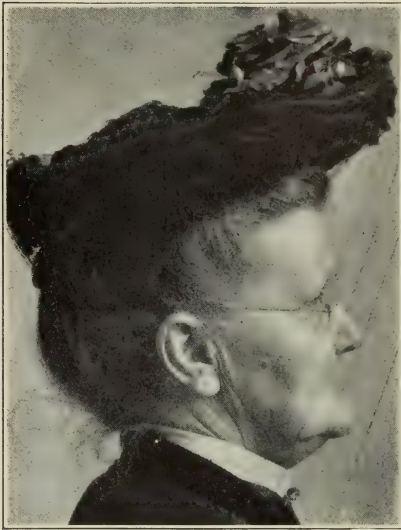


FIG. 2.



Profile and full-face views of edentulous case, showing marked loss of facial contours.

about the eye, the nose, and the mouth. Darwin has given us the clearest history of the evolution of the activities of these muscles in man and the animals, and according to him they had as their original purpose the protection of some of the special sense organs, or were certain movements associated with their functioning.

In man the contraction of certain groups of these muscles has become associated with the existence of certain thoughts or emotions, and this has developed to such an extent that these co-ordinated muscular movements have come not only to supplement language as a means of expressing ideas, but occasionally they replace it entirely. It is largely these facial movements of expres-

sion which they establish, and in the prominences for which the development of the muscles and their tonicity are responsible. This is the physiologic basis of facial expression.

We are interested in these muscular movements themselves as well as in the results of their habitual occurrence, for it is the face in action as well as in repose which gives identity to an individual and serves to us as the chief means of recognition.

EFFECT OF LOSS OF TEETH UPON THE FACE.

The effect of the loss of the teeth upon the lower third of the face is too well

known to require description, the sunken lips, the approximated jaws, and the absence of teeth being a classic picture recognized by all; but for sake of analyzing the problem to which we are to address ourselves in repairing these results, it may be well to rehearse the details of these changes in the countenance. The fixed expression of the face is affected by the withdrawal of the support of the lips and cheeks and the ensuing alteration of their contours. The teeth no longer hold the jaws a fixed distance apart, and these are brought closer together. The muscles centering in the orbicularis oris are no longer furnished with an underlying base over which the lips may be drawn in the movements of expression, and so far as the mouth is concerned, these activities are seriously restricted. Finally, the absence of the teeth as an important feature of the face must be considered as one of the greatest factors in this alteration of appearance, which we are to endeavor to restore by artificial dentures. (See Figs. 1 and 2.)

What means have we at our disposal, and how is the restoration to be made?

If we lay aside temporarily the various demands upon dentures imposed by the functions of mastication and speech, we may assert that these various details of the appearance of the face may be satisfactorily re-established by the artificial denture. The buccal and labial contours of the plates, the distance between the jaws established by them, and the positions and appearance of the teeth themselves may be arranged to produce the desired result in practically every instance. There is, however, in every case the necessity for some compromise between these cosmetic considerations and those pertaining to the usefulness of the appliance, but in the vast majority of cases which require treatment at our hands, this compromise may be arranged without material disadvantage to either interest. The type of restoration in which most has to be sacrificed to the utilitarian purposes of the denture will be referred to presently; meanwhile, we shall continue our attention to the main subject-matter in hand.

In any constructive work, the logical

order of procedure is the collection of data as to the requirements of the case, the designing of the work to fit these data, and its execution according to the accepted standards for such work. In every prosthetic restoration the usual records obtained at the time at which the bite is taken serve as the groundwork for the operation. Besides this, any information which can be obtained concerning the appearance of the person before the loss of the teeth will be useful. At best these data will be incomplete, and it is necessary to supply the remaining details in the restoration from a judgment as to their harmonious association with those other features of the face which have not been altered.

The work, then, is to be done as far as possible from data obtained from the patient, but incompleteness in its details is to be supplied by a judgment as to their fitness for the case in hand. This latter requires a somewhat extended knowledge of the face in its completeness—a knowledge, however, which is perfectly obtainable by everyone.

JUDGMENTS UPON THE HUMAN FACE.

Let us briefly analyze this phase of the question. Mantegazza has described five verdicts which may be taken upon the human face. They are a mental, a moral, an ethnological, an esthetic, and a physiological verdict. Our interest in the mental and moral values of a face is not extensively related to the problem which we are studying. The reason for this is that the area in which the dentist may affect the expression of the face does not pertain considerably either to its mental or moral quality. The dentist is able only to arrange the contours about the mouth and establish a certain distance between the jaws. The mental and moral values of a face are largely judged by the other features, which are not included in the dental field.

Certain qualities of the mind are associated with the expression of the lips. A long upper lip indicates firmness, and when it curves in at its junction with the lower, it marks determination. If it

curves outward it shows ambition, while a short upper lip indicates weakness and a wavering disposition. Thick lips indicate sensuousness, while thin lips are associated with refinement of feeling, and when pressed together firmly at their edges signify courage. The disposition of the lips largely depends on the relation of the jaws, and from this latter we get much information concerning their relative position. We cannot neglect

FIG. 3.



Wrinkles caused by muscular action and absorption of fat.

this, nor can we alter it. We cannot change the thickness of the lips. After we have made them conform to the anatomical demands, we can only modify a few details which do not extensively relate to the qualities of mind and character.

The ethnological verdict concerns us to a greater extent, but only in this way: A certain familiarity with racial types is necessary in order that we may make the contours about the mouth conform to the type of the case being treated; thus, for example, in the Caucasian races the lips are not so prominent as in the Negroid races.

Our interest is chiefly with the esthetic

and the physiological verdicts. Ability to pass an esthetic judgment on a face for which a restoration is to be made has a distinct service. Our object in the establishment of facial contours is to restore the former appearance of the patient as nearly as we are able from the data at hand. When these data are incomplete, the discrepancies should be filled in with the desire to make them beautiful when there is an opportunity of the choice of two means. Familiarity with the beautiful in faces is a necessary qualification to this end. This does not necessarily mean that one must have a complete knowledge of the standards of art, although this would be useful. The standards of beauty vary with the nation, with the age, with the individual. What we require chiefly is an appreciation of harmony of proportion. Few art students, it is said, ever gain the ability to judge well of the proportions of the human face, but experience in a study of faces and an acquaintance with the portrayals of beautiful faces on canvas and in marble are most useful in a cultivation of this appreciation of proportion.

The physiological verdict includes the state of health of the individual and his or her approximate age. The first of these does not pertain to our subject. With the second we are greatly concerned. The necessity for a fairly accurate judgment of age is apparent in the undertaking of each prosthetic operation. An individual changes constantly from youth to old age, and the alterations in all of the bodily tissues are harmonious. It would be manifestly an anachronism to establish oral contours in a person of fifty which would be proper to one of twenty-five. Let us consider for a moment what some of these changes are in the face and its contours. Youth is the period of rounded contours and full muscles. As age progresses the chief changes which occur in the face are the establishment of folds and wrinkles from muscular action and the absorption of fat. In middle life the contours are far less rounded, and the markings upon the surface of the face are much more distinct. As old age approaches, the fat

not only between the muscles but underlying the skin is greatly absorbed, and wrinkles make their appearance. Wrinkles due to muscular action, Lavatar has pointed out, are established at right angles to the line of muscular pull. They are commonly found at the following places: Five or six horizontal wrinkles on the forehead, due to the

is increased, and a marked wrinkle appears at the corner of the mouth. It is very obvious that in a prosthetic restoration no attempt should be made to establish a fulness of the plates which will eradicate all of the wrinkles about the mouth. Only those due to the edentulous condition should be obliterated. The sulcus naso-labialis, for example,

FIG. 4.



Upper bite-plate in position.

FIG. 5.



Upper and lower bite-plates in place and trimmed tentatively as to restoration of contour.

action of the occipito-frontalis; two or three vertical ones between the eyebrows, due to the corrugator supercilii; a few radiating wrinkles from the external canthus of the eye, due to the orbicularis palpebrarum; the sulcus naso-labialis, which extends from the ala of the nose into the cheek, and is largely caused by the action of the elevators of the corner of the mouth. (Fig. 3.)

Let us differentiate these from the wrinkles due to the loss of the teeth. Frequently a group of small wrinkles radiating about the mouth appears after the teeth are removed. These are due to the increased sphincter action of the orbicularis oris; the sulcus naso-labialis

should be made to accord with the approximate age of the patient, for this natural marking appears upon the face usually only at a period shortly before adult life; it becomes accentuated as age increases, and of course its extent varies with individuals.

The wrinkles in the skin due to fat-absorption alone are not related to our problem. In some individuals they appear late in life, and are more or less uniformly distributed over the face.

TECHNIQUE OF FACIAL RESTORATION.

Now, having established a background for our facial restoration, let us discuss

the technique by which it is accomplished. The major portion of the designing is done at the time when the bite is taken; full upper and lower bite-plates are prepared according to accepted methods; the upper bite-plate is tried in, and its buccal and labial contours should make a tentative restoration of the lips and cheeks. As this will be discussed presently, we shall not now describe the contours which this plate

clined slightly outward from its base, should slightly overhang the lower, which latter should be everted and present between it and the chin a graceful curve. Such adjustment in the buccal and labial contours of these plates should now be made as the establishment of correct contours, according to details presently to be given, demands. This is for the purpose of using the bite-plates as rough models for these particulars of the dentures

FIG. 6.



FIG. 7.



Profile views of edentulous case before and after facial restoration with artificial dentures.

should establish. The occlusal edge of the plate is trimmed to extend one thirty-second of an inch below the upper lip when in repose (Fig. 4); the lower bite-plate is tried in, and any adjustment to determine the distance between the jaws should be made in this lower bite-plate, and no alteration should be made in the length of the upper. The distance between the jaws established by the bite-plates must be judged from the external appearance of the face. (Fig. 5.) As the determination of this is to be subsequently discussed, suffice it now to remark that the lips when in repose should simply be in contact over the supporting bite-plates. The upper lip should be in-

themselves. It must be remembered in this connection that the contours of the lips and the distance between the jaws should be considered conjointly, for both affect the appearance of the mouth as restored.

Utilizing the bite-plates as guides in the construction of the dentures, the buccal and labial contours of the latter should be arranged to accord therewith, and the final adjustment of these details should be made by actual trial of the plates in the mouth, while they are still capable of alteration. The plates when completed ought to establish oral contours in harmony with the general plan which is now to be described.

ESTABLISHMENT OF CORRECT PROFILE.

For the sake of simplicity, it will be better to consider the face in profile first, and then from a front view. (Figs. 6 and 7.) Beginning with the base of the nose, which is situated at the edge of the areas over which we have control, the upper lip should incline slightly outward. It is a general rule in faces that the amount of

gins, the upper lip being slightly in advance of the lower. Under normal circumstances, the edge of the lower lip is slightly everted. This is due chiefly to the fact that the upper anterior teeth rest upon it, serving to roll it outward. Also at the lower boundary of the lip the skin is closely adherent to the chin. In most persons these conditions serve to establish a graceful curve between the

FIG. 8.



FIG. 9.



Full-face views of edentulous case before and after restoration with artificial dentures: showing facial landmarks.

protrusion of the lips is in accord with the retrusion of the forehead, for retruding foreheads are usually associated with protruding lips, and full foreheads are generally accompanied by lips more nearly vertically placed. The thickness of the lip, as well as the age of the patient, also affects this detail. In older patients, in whom one would expect that an atrophy of the muscles and an absorption of the fat would reduce the thickness of the lip, it would be more nearly vertical; on the other hand, for persons who naturally have thick lips, the protrusion should be more marked.

When the lips are in repose, they should be lightly in contact at their mar-

margin of the lip and the chin, which is known as the sulcus mento-labialis. Where this existed originally, and where it is possible to secure it, the establishment of this curve contributes greatly to the beauty of the profile.

FACIAL CONTOURS AS VIEWED FROM THE FRONT.

Viewing the face from the front, several points require special attention. (Figs. 8 and 9.) The first and most important of these is the fulness overlying the canine region. Inasmuch as greater absorption follows the loss of the canines than occurs elsewhere in

the mouth, greater fulness is required for the plate in this region; for-

and its fulness may be all that a case demands. It is desired to give character

FIG. 10.



FIG. 11.



Profile and full-face views of restoration by artificial dentures of case shown in Figs. 1 and 2.

FIG. 12.



FIG. 13.



Profile views of patient advanced in years, showing restoration of oral contours for such a case.

Unfortunately, no muscular attachments serve to limit the height of the plate here, to the mouth by conferring upon it external fulness at this point, but it is

necessary to remember that the sulcus naso-labialis must not be obliterated, and the canine fulness is to be adjusted so that this fold will be retained in a form suitable to the age of the patient. This fold is a very useful guide in judging of the amount of contour to be established at this point. (Figs. 10 and 11.)

The most beautiful mouths are characterized by a slight dipping below the

tablish it; it is evident that in a majority of cases only a straight line or one almost imperceptibly curved will be the result of our restoration.

Several points of surface contour require our attention: The philtrum may sometimes be satisfactorily established even where the teeth have been absent for some time, but when the patient is old, this would have largely disappeared

FIG. 14.

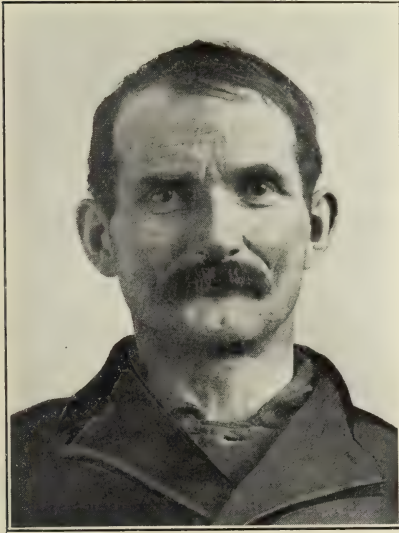
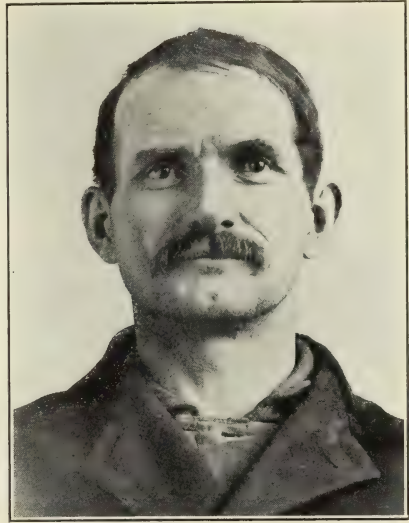


FIG. 15.



Before and after restoration of fulness of cheeks by artificial denture.

surface of their corners. This detail is largely affected in any restoration by the form of the canine contour; a roundness of this tends to preserve the natural dipping-in of the mouth corner. (Figs. 12 and 13.)

In its most ideal form, the line marking the contact between the lips follows the well-known curve of Cupid's bow. The former possession of this, the age of the patient, and the length of time during which the teeth have been absent will largely determine whether it is possible to establish this in a given case. It is evident that too great fulness of the plates would tend to straighten out the lines of this curve in lips where it would be possible to es-

had the teeth not been lost. Here again, too great fulness of the plates would tend to obliterate this, and in all cases in which enough of it remains for utilization it should be most carefully preserved. A common error in making the lower plate too full at the canine region results in a surface prominence below the corner of the mouth on each side of the lower lip. This tends to give the person an unpleasant pouting expression, and should be avoided. The curve beneath the lower lip and the chin frequently requires a somewhat extensive cutting of the front of the lower plate, but the end usually justifies the means, and this detail almost more than any other is deserving of careful attention.

Occasionally, it may be necessary to give special attention to the fulness of the plate in the region of the molars and bicuspids. (Figs. 14 and 15.) Loss of the teeth does not greatly affect the appearance of the tissues here except in very thin persons. In such cases, and in those in which the pad of fat underlying the risorius muscle has been absorbed, the external contours must be restored by additions to the plate. The general plan to be pursued as far as the exterior is concerned is to restore the curved surface of the cheek.

Besides restoring the fixed expression of the face, artificial dentures must permit the activities of the facial muscles of expression. Ordinarily, no special heed need be given to this requirement. If the plates restore the external appear-

ance, they provide a support for the lips over which these tissues may be drawn by the muscles centering in the orbicularis oris. It is only necessary in addition to see that the margins of the plate, especially the lower, do not impinge upon the bony attachment of these muscles. The ones affected are the depressor alæ nasi and compressor nasi in the upper incisive fossa, the levator anguli oris in the upper canine fossa, and the levator menti in the lower incisive fossa.

Finally, in order that the restoration of appearance may be complete, the teeth themselves when displayed to view must be in accord with the other features of the face. The determination of the details of the teeth is beside our subject, and is one so elaborate that no further reference will be made to it.

THE PRINCIPLES OF RETENTION OF ARTIFICIAL DENTURES.

By GEO. H. WILSON, D.D.S., Cleveland, Ohio.

(Read before Section I of the National Dental Association, at its annual meeting, Birmingham, Ala., March 30, 1909.)

THE retention of artificial dentures is purely mechanical and is based upon the laws of physics. Indirectly, however, the personal equation is an important factor, in that the patient may not be able to control the laws of physics. These vexatious cases are often spoken of as awkward or clumsy, but such patients will eventually succeed in overcoming the difficulties provided they have sufficient perseverance.

The physical laws that play a more or less important rôle in the retention of artificial dentures are atmospheric pressure, adhesion by contact, leverage, tension, friction, and adhesion or cementation. These forces are not equal in value, nor can any one principle be depended upon for retaining a denture. There will be a primary principle selected to bear the

burden, and one or more secondary forces evoked or unwittingly included. These secondary forces may be either positive or negative. Thus atmospheric pressure may be selected as the primary retentive force, but adhesion by contact must be an associate retentive force whether it be so designed or not, and eventually will entirely take the place of atmospheric pressure in any given case. The principle of leverage is always associated, through antagonization, with whatever may be the primary method selected. This force especially may be considered as positive when the arrangement of the teeth is such that it tends to force the denture more securely to place, and as negative when the arrangement is such that antagonization tends to loosen the denture.

To consider this subject in its entirety would require too lengthy a paper, therefore we shall define these five physical laws as applicable to prosthesis, and consider some of their practical applications.

ATMOSPHERIC PRESSURE.

As is well known, atmospheric pressure is the weight of a column of air resting upon an object. The weight of a column of air at the sea level is 14.7 pounds to the square inch, and decreases in the ratio to the height above sea level. As this pressure is equal in every direction upon and within the human body it is not perceptible. Whenever a portion of this column of air is removed from a circumscribed portion of the body, its effect is immediately felt. No substance can be placed between the atmosphere and the surface, or a portion of the surface of the body, and remove the pressure of the atmosphere from the body, as the intervening substance, being contiguous, would be held against the surface of the body by the full weight of the column of air resting upon it. Thus we may justly conclude that an artificial denture perfectly adjusted to the tissues of the mouth would be retained by the full weight of the column of air, or approximately fifteen pounds for each square inch of surface covered; also that a chamber cut in the maxillary surface of the plate would be a positive detriment, because it would be an air-chamber equalizing the column of air upon the external surface of the plate to the extent of the air-chamber. However, there is a fatal obstacle to this perfect retention of an artificial denture, for it is a physical impossibility to exclude the film of air between the soft tissues of the mouth and the hard base-plate except by substituting a fluid for the film of air. By this substitution of a fluid for the film of air the law of hydrostatics is introduced. The law of hydrostatics is, that a pressure placed upon a confined liquid is equal in every direction. Therefore a mechanically perfectly adapted artificial denture having a fluid contact cannot be so retained, because the intervening fluid

equalizes, within and without, the atmospheric pressure.

Atmospheric pressure *may be utilized* to retain an artificial denture, but through the medium only of a vacuum chamber. Since an absolute vacuum is an impossibility, the amount of retention by atmospheric pressure is contingent upon the square surface of the chamber and the vacuity obtained. To produce any degree of vacuity it is necessary to have the plate surrounding the vacuum cavity perfectly adapted to the soft tissues. The extent of exhaustion of the air from the chamber is governed by the power of the muscles of the tongue and the ability of the patient to apply them. The exhaustion is produced by forceful swallowing.

Retention by atmospheric pressure can only be temporary, and maintained only so long as there is a partial vacuum. The effect of the vacuum chamber upon the tissues of the mouth is the same as cupping in medical practice. As soon as the atmospheric pressure is reduced upon a circumscribed portion of the body, it acts as an excitant, causing an increased blood pressure in the part, with a temporary swelling, and if continued a proliferation of tissue cells, producing a permanent growth until the chamber is filled. When the chamber is filled by tissue and the fluids of the mouth, atmospheric pressure can no longer exist; the denture is then retained only by adhesion by contact. While the term "suction plate" is not so euphonious as "atmospheric pressure plate," it more nearly expresses the truth without attempting an explanation of how the suction is secured.

As the amount of retention of a vacuum chamber stands in direct ratio to its square surface, so its relative permanence and its injurious effects stand in direct ratio to its depth.

ADHESION BY CONTACT.

This retentive force is too often confused with atmospheric pressure, whereas it is an entirely different principle. Atmospheric pressure retention is contin-

gent upon a chamber which is more or less evacuated of air, while adhesion by contact is conditioned by uniform pressure and absolute contact. To comprehend this principle of retention, the molecular forces of attraction and repulsion must be appreciated. These two molecular forces, to a greater or less extent, exist within and between all bodies. In solid matter attraction predominates over repulsion, whereas in liquids the two forces are equal, and in gaseous matter repulsion predominates over attraction. Attraction is always stronger between like atoms than between unlike atoms. (This last fact is beautifully illustrated in the low-fusing alloys composed of tin, lead, bismuth, and cadmium. These metals range in fusing point from 442° F. to 617° F., yet when they are properly combined they may fuse at 135° F., thus demonstrating that the molecules of these metals create a marked repulsion for each other, and that it takes but a low degree of heat to render attraction and repulsion equal, that is, to fuse to a liquid state.) When like atoms are brought into atomic relation to each other, they are said to be held together by cohesion; when the interatomic space is exceeded, they can only be held together by adhesion, either by mass attraction or an intervening adhesive substance. Thus it is apparent that the expression "uniform pressure" and "absolute contact" are misnomers, because absolute contact is an impossibility; but when these terms are used, they signify the closest mechanical contact of the mass, and do not refer to the atom relationships. When masses of matter are brought into mechanical contact and are caused to adhere by a film of non-adhesive fluid, it might be thought that the adhesion is due to the strength of the fluid, but this is not the case, because the thinner the film the greater the adhesion. That this adhesion is not due to atmospheric pressure can be demonstrated by suspending two masses of matter adhering by contact in the chamber of an air-pump and exhausting the air, when the adhesion will remain the same as under normal atmospheric

conditions. Therefore, through an understanding of these axioms regarding attraction and repulsion, we can appreciate how artificial dentures are retained by the so-called adhesion by contact.

LEVERAGE.

In mechanics the lever is a rigid bar working upon a pivot. The pivot is called the fulcrum, and the bar is considered as two portions called arms—the one called the power arm and the other the work arm. There are three groups of these factors, fulcrum, power, and work arms, called classes. In the first class the fulcrum is between the power and the work, whereas in the second class the work is between the fulcrum and the power; in the third class the power is between the fulcrum and the work. In prosthetic dentistry the lever of the first class only need be considered, and it is of great importance. This principle of physics is involved in every case of prosthetic restoration, either in its positive or negative sense, and too often in both. In complete artificial dentures the alveolar ridge constitutes the fulcrum, and the retention of the base-plate by either atmospheric pressure or adhesion by contact constitutes the power; the portion of the base-plate upon which these retentive forces exert their influence constitutes the power arm. The teeth form the work arm, and antagonization is the work. In partial artificial dentures the remaining natural teeth and roots may be the fulcrum or even fulcrums.

The law governing the direction of energy should be taken into consideration. The law is: Energy moves in a straight line and at right angles to the surface from which the force emanates. Thus in the lines of energy there may be great resistance, while laterally there would be but slight resistance. (This is well illustrated by two plates of glass held together by adhesion by contact, which will offer much resistance to an effort to pull them directly apart, but only slight resistance to lateral pressure.)

The anatomical relation of the mandible to the maxilla is a peculiar one, and

offers many problems in physics. As resorption of the alveoli progresses, these adverse conditions become exaggerated. Therefore it follows that artificial substitutes should be inserted soon, that is, within a few weeks—two to six—after the removal of the natural teeth. As the resorption of the alveolar processes progresses, the summit of the alveolar ridge of the upper jaw recedes upward and inward, whereas the summit of the alveolar ridge of the mandible recedes downward and outward. Hence, if the artificial teeth are set in the position occupied by the natural teeth, the problems in leverage become very serious. It is apparent that if the upper teeth could be arranged with their buccal surfaces just inside the summit of the alveolar ridge, it would be impossible to dislodge the base-plate by direct occlusion, no matter how hard or circumscribed the bolus of food; but as it is not practical to so arrange the teeth, it is desirable, from a mechanical point of view, to approach this condition as nearly as the individual case will permit. If, after the alveoli have thoroughly receded, the upper artificial teeth are mounted upon the base-plate in their normal distance from the raphé, the work arm of the lever is relatively much lengthened. Therefore to overcome this untoward leverage, the teeth are drawn in toward the summit of the ridge. There is a limit to the inward drawing of the lingual surface of the teeth, for undue encroaching upon the domain of the tongue will ensue. That this work arm may be still further shortened, the artificial teeth bucco-lingually are made narrower than normal. As the shortening of the radius shortens the circumference of a circle, it becomes necessary to select artificial bicuspid and molars a little narrower mesio-distally than the natural teeth which they replace. This is but one of the reasons for the reduced size of the grinding teeth. The other reason for reducing the size of these teeth has to do with their power, and should not be discussed together with the principles of retention. We have already stated that motion—force—moves at right angles to the surface from

which the motion emanates, therefore the shaping of the facets of the occlusal surface of the bicuspid and molars is an important factor in the problems of leverage.

TENSO-FRICTION.

This term is used to cover all those cases where retention is obtained by contact, but the surface of contact is too insignificant to constitute a factor. It includes all forms of clasps, removable plate-bridge attachments, spiral springs, and spring plates. It implies that the retention is obtained by friction through tension. The simplest form of tenso-friction is the spring clasp, in which the narrow strip of metal grips a tooth by friction through the tension in the metal. Further than defining this term, we will not discuss it, as it is in itself a subject for a lengthy paper.

ADHESION OR CEMENTATION.

This term is used to denote that an adhesive substance, as cement, is used as the means of retention. All kinds of fixed bridge work and the so-called "alveolar dentistry" are in this class. This phase of retention will not be further discussed in this paper.

PRACTICAL APPLICATIONS.

It is often said that the difficulties of retention of artificial dentures are in direct ratio to the number of teeth supplied. Broadly speaking this is true. In the remainder of this paper we shall confine ourselves to edentulous jaws and to the first two methods of retention—namely, atmospheric pressure and adhesion by contact. Leverage has to do with the arranging of the teeth upon the base-plate, and antagonization therefore will not be discussed. Thus we have reduced our subject to the consideration of the retention of base-plates upon edentulous jaws.

There are four factors to be considered in the retention of base-plates: Size—that is, the amount of surface covered; soft tissue; fluids of the mouth; and, of

the least importance, the shape of the portion covered.

Size. In any given case the amount of retention by adhesion by contact is, like atmospheric pressure, according to the area of the surface. Hence, other things being equal, the larger the denture the better the retention.

Soft tissue. No one factor has so much to do with retention of artificial dentures as the soft tissues. These may be divided into three classes—muscles and their attachments, submucous tissue, and the mucous membrane. As an axiom it may be stated that a base-plate cannot rest upon a muscle which impinges upon or draws over the periphery of the plate, as the contractile power of the muscle is greater than the retentive force of adhesion by contact. The muscle attachments should always be observed in examining the mouth prior to taking the impression; then, in taking the impression, the muscles should be marked in the impression, so that the base-plate may secure a close adaptation about the muscle attachments and yet not be dislodged thereby. As adhesion by contact is in the ratio to the surface covered, it is apparent that the base-plate should extend as far in every direction as the attachment of the muscles will permit, but not so far that the muscles when placed upon their greatest tension will impinge upon the periphery sufficiently to dislodge it. This may give a very irregular outline, but the proper outlining of the periphery of the base-plate is one of the important operations in adapting artificial dentures. Beginning in the median line, the labial flange of the upper base-plate should be well cut away for the labial frenum, then gradually ascend to the canine eminence, where for cosmetic effects it must be as high as possible. After forming the outline of the canine eminence, the border of the flange abruptly drops to accommodate the buccal frenum or levator anguli oris. The remainder of the border to the tuberosity must be kept as high as the attachment of the buccinator muscle will permit. In passing around the tuberosity, if there be one, the edge

of the base-plate must not impinge too much upon the soft tissues. After trimming the base-plate to what seems to be the proper outline, it should be tested by moistening the maxillary surface, placing in the mouth, and instructing the patient how to exhaust the air from between the base-plate and soft tissues upon which it rests. The patient should then be requested to vigorously work the muscles of the lip and cheeks, and see if in any way the base-plate can be dislodged. If so, the patient should again attach the base-plate, the operator grasping the lip and cheeks, one portion at a time, between the thumb and finger, and firmly extend the tissues outward and downward until the point or points that are not properly relieved are discovered.

The lower base-plate is of horseshoe or crescent shape, and necessarily covers much less surface than the upper one; but if the impression is properly taken and the periphery properly adjusted for the muscle attachments, the base-plate can be seated, and sometimes considerable adhesion obtained. Some writers would lead one to believe that all lower artificial dentures should have a deep lingual flange, while other writers would have the lingual flange almost entirely removed. Both are correct, because some cases require the one treatment and other cases the other method. In those cases in which the crest of the alveolar process of the mandible is pronounced, and the attachment of the mylo-hyoideus muscle is low upon the lingual wall, the lingual flange of the base-plate can and should be carried well down, for adhesion by contact is according to the area of the surface, and the larger the base-plate the greater the resistance to the force of mastication; but if there is excessive resorption of the process, and the attachment of the mylo-hyoideus is at or very near the crest of the slight ridge remaining, or if there is a sharp edge representing the union of the lingual plate of the mandible and the remains of the alveolar process, there should be almost no lingual flange to the base-plate. If in taking the impression the mylo-hyoideus is compressed and depressed, the

apparent space for a lingual flange will prove very delusive and troublesome; also, if the base-plate is carried over the sharp lingual edge often found upon the mandible, much irritation will be produced. In these cases the only means of success is to cut away the lingual flange, if one has been formed. In constructing the superstructure upon this properly fitted short lingual flanged base-plate, an extra retention flange of one-sixteenth to three-sixteenths of an inch in width may be extended horizontally into the mouth, when the glands and folds of mucous membranes resting upon this enlarged base-plate will often be of much aid in retention. The buccal flange should be kept as broad as the muscle attachments will permit. The same tests applied to the upper base-plates should be used with the lower.

Submucous tissue. In this class is included all the soft tissue of whatever histological formation—except the muscle tissue just considered—lying beneath the mucous membrane upon which the base-plate rests. When a moderate amount of soft tissue is evenly disposed beneath the mucous membrane, the very best condition possible as far as this tissue is concerned is presented. In some mouths the rhaps of the maxillæ will be found over-developed, and covered with a thin, tensely drawn mucous membrane, while upon either side there may be an area extending well toward the base of the alveolar process with more or less submucous tissue, and a portion of the alveolar ridge composed of soft flabby tissue only. If a patient representing such a mouth has not long since acquired the knack of wearing artificial dentures, the chances of his success are very unfavorable. The treatment for such a case would be to relieve the pressure upon the whole length of the rhaps; let the soft tissue in the vault alone and increase the pressure upon the soft portion of the alveolar ridge. A vacuum chamber in such a case, placed over a portion of the tense membrane in the highest portion of the vault would be a source of irritation and useless.

Mucous membrane. This membrane

must bear the burden of supporting all complete artificial dentures, therefore an appreciation of its capabilities is an important factor to the prosthetist. In examining the mouth prior to taking the impression the condition of health of this tissue over which the base-plate is to be placed should be noted, and if necessary, the required attention should be given. There are two qualities of this membrane to be considered—tone and tension.

Tone. This membrane is much influenced by the health of the individual, and may be quite an index of the condition of the general system. The patient will learn that when the general system is vigorous and rested, the denture will have its maximum retention, but when the system is debilitated or relaxed from temporary exhaustion—tired—the retention of the denture will be poor and troublesome. When patients complain that their dentures are not “sticking up” as well as they did, it is well to investigate the tone of the system and explain this principle. When the mucous membrane loses tone for any reason, the retention of the denture will be correspondingly affected. When dissolution is about to take place, it may be noticed that artificial dentures cannot be retained at all. Because of this quality of tone, other conditions being equal, the younger the patient the better the retention. Aged patients in a debilitated state of health and unacquainted with the use of artificial dentures should not be encouraged in having their mouths fitted to new dentures, for the tax upon their vitality may be too great, and hasten their death.

Tension. When a surface upon which a denture is to be worn is covered with healthy mucous membrane, evenly underlain with a medium amount of submucous tissue, and the tone is good, as far as the tissues are concerned, the very best conditions exist for retaining an artificial denture.

When the soft tissues covering the roof of the mouth are thin and tense, the case is much more difficult. In the former case the tissues will quickly conform to the hard base-plate, and if there has been a reasonably skilful construction of the

appliance, the retention will be satisfactory. In the latter case, with the most skilful construction it will often require an hour or two before the mucous membrane conforms to the unyielding material of the base-plate. It is this class of cases that tempts the dentist to use velum rubber lining to the periphery of the plate, or to resort to the patent soft rubber retainers. As this condition of the mouth is the only logical one in which these retainers are permissible, little harm is done if they are never used where not indicated. In these cases of tense mucous tissue no sharp edges or localized increased pressure by any means whatever can be tolerated. Carving of the cast is contra-indicated.

When the mucous membrane is excessively underlaid with soft tissue over the roof of the mouth, and deeply fissured, the case can justly be classed as unfavorable for retention. The cast of such a case may be carved with impunity. The object sought in carving is to cause the periphery of the plate to embed itself more firmly, or to raise a bead just inside the periphery. This temporarily creates a large vacuum chamber, but as soon as the raised portion becomes embedded into the soft tissues, adhesion by contact is secured. In some cases the bead acts as a barrier to the ingress of an excessive amount of fluid.

Many cases presenting will have areas of thin tense tissue and other areas of excessively soft tissue. The treatment for this class of cases has already been stated, that is, relieving of the pressure upon the tense tissue in the proximity of the rhaps, to the extent of its entire length. This can usually be accom-

plished by the addition of one or two layers of No. 60 tin foil. The soft areas over any portion of the vault should not be changed, but an excessively soft tissue upon the alveolar ridge should be compressed. Rarely should any hard portion of the alveolar ridge be relieved, then only when very circumscribed.

Fluids of the mouth. The normal thin watery fluid of the mouth is most favorable for retention by adhesion by contact. This fluid makes the contact, but does not hold the base-plate so far away as to interfere with the adhesion by contact. When the fluids are vitiated, thick, and ropy, they may have sticky properties, but not enough to compensate for the interference with adhesion by contact. Temporarily these vitiated secretions can be removed from the mouth by thoroughly washing with an alkaline solution, then inserting the denture well moistened with cold water.

Shape. The shape of the vault of the mouth is a minor factor. The size, tissues, and fluids are the factors that govern adhesion, with one exception. A high-pitched compressed vault is unfavorable in shape, because the resistance to stress is lateral instead of being at right angles.

Summary. The essentials of retention of complete artificial dentures may be summarized as: Properly diagnosing the conditions, a suitable impression, carefully preparing the cast, accurately adjusting the base-plate, carefully mounting the case with the face-bow and bite-gages upon the New Century articulator, proper antagonization, and infinite patience and perseverance while educating the patient in their use.

OBSERVATIONS ON CROWN AND BRIDGE WORK.

By H. HERBERT JOHNSON, D.D.S., Macon, Ga.

(Read before the National Dental Association, Section I, at the annual meeting, Birmingham, Ala., March 30, 1909.)

IN an unguarded moment I allowed myself to become obligated to write this paper. Since promising to do so the slight inclination felt at the time, which was mistaken for inspiration, has about departed, and I find myself in the deplorable condition of being unable to creditably proceed and too far obligated to gracefully decline.

With much regret thus to have to impose on this section, I shall take advantage of the only remaining avenue of retreat and make the effort very brief.

Upon making a deliberate survey of the subject, it is quickly discernible that little can be said that is either new or that would make even an interesting *résumé*. It would be tedious and tiresome to my hearers to introduce any detailed points of the technique such as is pursued in the making of bridge work that might come within my knowledge, as all practitioners of even slight pretensions are now familiar with the general ideas of construction. About the only thing apparent, therefore, and indeed all that I shall attempt, will be to introduce some old but as yet unsettled questions for discussion, in the hope of thus shedding more light for our future guidance.

As the comfort, the durability, and the strength of crown and bridge work depend upon the success of the method employed in making the abutments, pillars, and attachments, it has been decided to deal principally with that portion of the subject. Experience of many years has taught us valuable lessons concerning the amount of anchorage required to retain for a reasonable time pieces of work of varying extensiveness.

When bridge work was first intro-

duced, common sense seemed to indicate that as few remaining abutment teeth or roots were to be relied upon to perform the work of those lost as well as their own, a bridge would require a very strong and rigid attachment, and that nothing short of gold telescoping crowns and strongly banded roots would be sufficient for such support. With these ideas firmly fixed in our minds, in some instances great injury was wrought in cases of misfits, of teeth with short crowns, and roots broken down to or beneath the gum margin. In the firm belief that a broad surface of band was necessary for support, the bands were often cruelly driven far beneath the gum, resulting in inflammation, finally recession, and in many cases premature loss of the teeth or roots supporting the structure. Those of us who have been in practice a sufficient length of time to observe results are quite familiar with this class of cases. During that early period, also, the lack of good reliable cements had something to do with fixing these banding ideas in the minds of the practitioners, as it was thought that when bands were driven well beneath the gum margin, this covering would form a protection which would prevent the disintegration of the cement.

Viewing the progress of cases of many years' standing, these valuable truths are revealed to us. In almost all cases where bands of extraordinary width were fastened about teeth, even when this was done as skilfully as would be reasonable to expect, the result was a gradual recession, until these bands now do not reach to the gum, and in most cases have disclosed misfits that are a surprise to the makers.

Time has also shown that where bands and crowns have been carefully and neatly fitted, the cement has not disintegrated any faster after the margin of the band or crown has been deprived of its supposed gum protection than it did while thus covered. This, together with the observations gained in porcelain inlay work and other cemented fillings, would seem to prove that cemented bands and other attachments, when neatly fitted, last as well when not driven beneath the gum margin, and that the gum covering affords no special protection to the cement. It is further observed, as has been remarked, that all bands and telescoping crowns driven beneath the gum or extended farther over the tooth result in a misfit which increases the farther the band passes above the neck of the tooth. Then, as there will always be a dissolution of the cement for a certain space beneath such ill-fitted bands, it is plainly evident that the piece only receives support as far as there is any cement attachment, and that the extended margin of the band from which the cement has been dissolved gives no further support at all, and only proves an irritant which finally weakens the strength of the living attachment to the jaw itself. As the permanence of the work must rely at last upon the stability of the abutment teeth or roots in their living healthful attachment to the jaw, it is more than evident that nothing could be of greater importance than to look carefully to the preservation of this much-desired condition.

If this, then, is recognized as a proved fact, and further, if it is agreed that bands and other devices forced beneath the gum *do* create permanent harm, is it not high time that these irritating devices be forever discarded, and that we cast about for some better methods for the support of bridges?

The application of the more recent methods which so greatly simplify the making of half-caps, hoods, and molded fillings, will in a great many instances prove to be of advantage as a substitute for bands and ferrule crowns. It is gratifying to observe the firm support that can be obtained in even extensive

pieces with long spans of bridge work by the exclusive use of molded fillings and small hoods, when these hoods and fillings are further strengthened by iridio-platinum pins of small size extending some depth into sound dentin. Then, too, with this kind of attachment every portion of the margin will be visible, and accessible in case of future disintegration from any slight defect.

These points of weakness, if any occur, can readily be repaired by the insertion of a small filling at the margin where decay or disintegration has appeared. Bridge work that has been inserted with telescoping and banded crowns has been subjected to much criticism on account of unhygienic conditions, and in many instances this criticism has been just, and none too severe. Another forceful argument that may be raised in favor of the simpler forms of attachment is that in all probability it will be less necessary to destroy the pulps in abutment teeth or to render them liable to die afterward from excessive cutting away of enamel and dentin.

It has been forcefully argued in the past that no tooth should receive a crown unless its pulp has been first devitalized. We are already familiar with the points in this argument—that the tooth cannot be properly prepared, that the removal of so much enamel and the contact of so much metal with the sensitive dentin will afterward cause the pulp to die, etc. I have always opposed this idea and have advocated at all times the preservation of pulps whenever possible, and I am constrained to believe that it is entirely unnecessary to indulge in any wholesale destruction of pulps on account of crowning. There are many good reasons in favor of preserving pulps when teeth are to be covered with gold crowns, especially if these crowned teeth are to act as supports of much-needed bridges. The argument that a molar cannot be properly prepared for the fitting of a gold crown without devitalizing is not well founded. There are only a very few cases where this is positively true. Likewise my experience does not show that pulps die more often under gold crowns than they

do in filled teeth, and certainly no one would argue that every pulp should be devitalized before filling a tooth. A sound tooth properly ground for the reception of a gold crown should exhibit no more sensitiveness to thermal changes after the crown has been cemented in place for a week, than if it had never been crowned. It is more than probable that those frequent cases of pulps dying under gold crowns are often brought about through some deep-seated cavity which had encroached upon the pulp, and was not taken into consideration. Of course in such cases the crown should not

ties, and in a very short time the entire crown portion of the tooth is eaten away, and the first warning given is the sudden collapse of the end of the bridge under the stress of mastication. This may be a much-needed bridge, probably, the only resource for mastication, but there is no help for it, it must come out. Many of these cases have come under my observation, but never yet have I seen an abutment tooth entirely lost before warning was given in the case of a tooth containing a living pulp. This itself would be a strong enough argument to warn us to proceed carefully in promiscuous de-

FIG. 1.



FIG. 2.

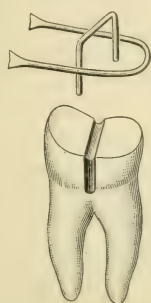


FIG. 3.

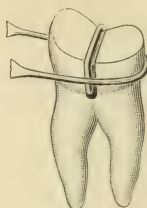


FIG. 4.



justly be held responsible. It must be remembered, also, that the cements may not be entirely free from contamination. With a cement of good quality mixed on a clean slab no trouble should arise.

A living pulp in a crowned tooth often gives a warning that results in saving a valuable bridge abutment for many more years of usefulness. It is well known that decay does frequently occur about the margins of gold crowns, usually after the piece of work has been worn for a number of years. If this should happen to a tooth containing a living pulp the warning is given by increased sensitiveness, and the necessary correction can be made in time to save the tooth. But suppose, on the other hand, that this should occur in a devitalized tooth. The patient is not warned, he neglects to undergo the necessary examination, decay progresses rapidly, many times more rapidly than in open cavi-

vitalizing. When we consider the other ill-effects from devitalized teeth, the argument should be even more than convincing.

In closing, just one or two practical suggestions will be offered that have proved to be helpful in practice. In making large cast gold fillings covering extensive areas, such as would be used in abutments for bridges, it is generally advisable to strengthen such attachments by the insertion of at least two pins or posts of iridio-platinum wire. When these fillings are to be cast from a wax mold, the operation of manipulating the wax will be greatly facilitated if the wire forming the pins is bent in the form of a staple, so that it may embed itself more firmly in the wax, thereby lessening the danger of displacement of the pins during the handling of the wax model for investment (Fig. 1). If the surface covered by the wax mold is broad, a

cross wire may be attached, which will greatly assist in preventing the warping of the wax while finishing and shaping the wax mold on the tooth, as illustrated also in Fig. 1. If a hood abutment after the Alexander method is to be cast, it will be found to be almost an impossibility to perfectly adapt the wax without resorting to some such method as that suggested in Figs. 2 and 3. By the application of this crib of No. 20 iridio-platinum wire, the operation of making the mold is very much simplified. After shaping the tooth and cutting the usual groove, the staple is adjusted to fit rather loosely. A piece of the wire is next bent in the form of a letter U and passed around the tooth, the flattened ends projecting buccally, and forming, with the staple to which it is soldered on one side, what we might call the crib. Mold a sheet of wax over the prepared tooth, press the crib to place, embedding the wires into the wax, building up to the desired contour with extra wax melted and spatulated on. When invested for casting, the projecting ends of the U wire, which may be flattened to add security, will be embedded in the investment, and hold the crib in place in the mold after the

wax has been melted or burned out. After casting, these ends can be cut off and saved.

Those who have had difficulty in such castings will find these methods simple and very helpful.

When molded fillings are to be used as abutments for bridges, it is often found difficult to keep these fillings in proper place while pouring the model from the impression or in the investment while soldering. Fig. 4 illustrates a method by which this can be accurately done. Place the fillings in the cavities and take the necessary bite for occluding the bridge. Then remove the fillings and attach a small piece of wire, projecting at right angles and soldered with a minute quantity of solder. Replace the fillings in the cavities and take the impression. These wires will be embedded in the impression material and come away with it. They may be left in place until the bridge is formed, to act as a stay in the investment, when they can be removed and the bridge can be polished.

These little knacks have helped me over some great difficulties, and I offer them with the hope that they may be of some assistance to others.

SURGICAL TECHNIQUE OF THE MAXILLARY SINUS.

By ARTHUR B. CRANE, D.D.S., Washington, D. C.

(Read before the District of Columbia Dental Society at its regular monthly meeting, May 1909.)

THE location of the antrum appears to make it a disputed field between the dentist and the rhinologist, being closely associated on the one hand with the cavity of the mouth and on the other with the cavity of the nose. If one takes into consideration, however, the etiology of the particular disease which makes curative treatment necessary, the rights of each branch of the healing art become immediately evident. If the den-

tist, therefore, would avoid conflict with the rhinologist, he should undertake to treat only such abnormal conditions of the antrum as may be clearly traced to some diseased condition of the tissues of the oral cavity; but as long as rhinologists do not hesitate to treat diseases of the antrum arising from alveolar abscess and other purely dental sources, it seems somewhat precipitate for them to condemn the dentist who operates within the

mouth for the relief of conditions arising from nasal sources.

It is not the purpose of this paper to enter into any discussion of the etiology or symptomatology of the various conditions of the antrum requiring surgical interference, as this phase of the subject receives exhaustive treatment in all text-books on rhinology and oral surgery, but to present as plainly as possible the operations commonly performed on the antrum, with a detailed technique, which it is hoped will be so lucid as to enable any dentist of average ability to handle the cases coming under his professional care.

In this, as in any other surgical procedure, an intimate knowledge of the anatomy of the field is essential, hence I will detain you for a few minutes with a review of the structure of this interesting sinus.

The maxillary sinus, as the antrum Highmori is more properly called, is a large, irregularly pyramidal space in the body of the superior maxillary bone, and is the largest of the sinuses accessory to the nose. Physiologically it gives resonance to the voice and lightness to the skull. It presents on examination five walls, as follows:

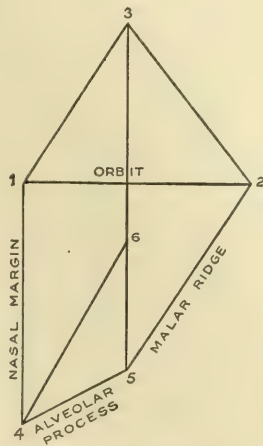
Roof or orbital wall, floor or alveolar wall, posterior or speno-maxillary wall, anterior or facial wall, and inner or nasal wall. The anterior and posterior walls together form the outer wall. To get a more comprehensive idea of these surfaces a diagram may be drawn representing an irregular hollow pyramid. (Fig. 1.)

The roof forms the floor of the orbit and consists of two thin plates of compact bone, between which, about in the middle of the roof, is the canal for the infra-orbital vessels and nerve, which emerge from the antrum immediately below the orbit.

The floor is that portion of the bone from which arises the alveolar process, and is in more or less intimate relation with the roots of the teeth. In large antra the palatal process of the superior maxillary bone also forms part of the floor.

The posterior wall is formed by the deflection of the outer wall from the malar ridge to coalesce with the inner wall, and in part by the palatal process of the sphenoid bone. It contains, at its lower angle, the canals for the posterior dental vessels and nerve, and serves for the attachment of muscles. It separates the antrum from the speno-maxillary fossa, which contains the internal maxillary artery.

FIG. 1.



1, 2, 3, Roof. 4, 5, 6, Floor. 2, 3, 5, 6, Posterior wall. 1, 2, 4, 5, Anterior wall. 1, 3, 4, 6, Internal wall. 1, 2, 4, 5 and 2, 3, 5, 6, Outer wall.

The anterior wall lies directly under the cheek. It is bounded above by the infra-orbital ridge, internally by the edge of the nose, below by the alveolar process, and externally by the malar ridge. It presents a marked depression above and behind the root of the cuspid tooth, known as the canine fossa, which marks the thinnest part of the anterior wall. At the upper extremity of this fossa is the foramen for the exit of the infra-orbital vessels and nerve.

The inner wall forms also the outer wall of the nasal fossa, and must be studied from both sides. From the antral side it presents anteriorly a protuberance running downward and backward from the upper anterior angle, which marks the course of the lacrymal

duct. Just behind this prominence, at the juncture of the inner and upper wall, will always be found the ostium maxillare, which is the normal opening of the antrum into the middle meatus of the nose and, as Cryer has shown, is continuous with the hiatus semilunaris. This opening is never absent and is never obliterated except pathologically. Directly behind the ostium maxillare is found the thinnest part of the inner wall, often being membranous in character. Viewed from the nasal side in its recent state, the internal wall presents two overhanging ridges known as the middle and inferior turbinates, each of which sends out a process known as the processus uncinatus. These processes, together with two membranes arising therefrom, completely obliterate the large heart-shaped opening which is seen in the skeleton specimen, and form the walls of the hiatus semilunaris and infundibulum. In the middle part of the middle meatus, behind the lacrymal duct, will be found the normal opening of the antrum, and often one or more accessory openings also.

The sinus is often divided by bony septa arising from the floor and extending about one-third way up the lateral walls, and frequently contains pockets or constrictions at its various angles. It is lined throughout with periosteum, over which a mucous membrane of ciliated epithelium, containing glandular cells for the secretion of the normal fluids of the antrum, is laid. This is known as the Schneiderian membrane, and is a continuation of the lining of the nose. The blood supply is derived from the internal maxillary artery.

The shape of the antrum is modified by various normal conditions, and its size also varies from one dram to two ounces capacity.

The simplest and most commonly performed operation on the maxillary sinus is known as the exploratory puncture for the conservative treatment of the antrum. This, as the term implies, is an artificial opening made for the purpose of examining the contents and area of the sinus, which is subsequently used as a drainage and irrigating aperture. Rhinol-

ogists generally follow the practice of making this puncture through the inferior meatus of the nasal fossa, by means of a properly shaped cannula with a pointed end, entering the antrum through the antral process of the inferior turbinate body, at a point about one inch behind its anterior tip. While this location has much to recommend it, in that it is less liable to be the pathway of external infection or foreign bodies, it is open to the objections that it is hidden from direct view, is often one-eighth to one-half inch higher than the most dependent part of the floor of the antrum, and therefore serves only as a partial drainage for its contents, and is continually filling up with granulation tissue springing up from the floor of the nose. Another objection is that it is probably the most difficult point from which to take measurements of the cavity.

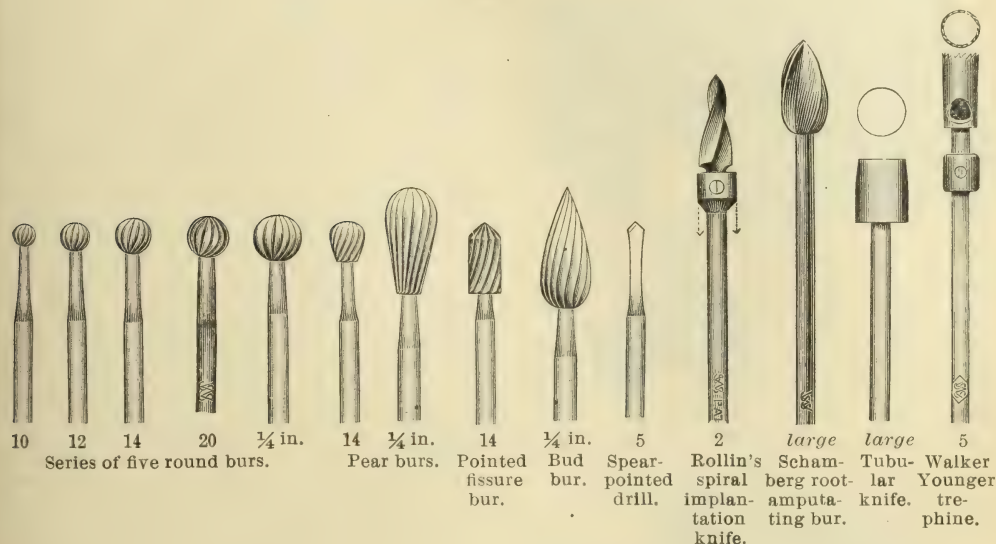
Dental surgeons most frequently make the opening through the root-socket of one of the teeth. The anterior buccal root of the second molar generally offers the best location, but I have seen one case in which the root of the lateral incisor pierced the floor, and several in which the cavity extended posteriorly to the extremity of the alveolar tuberosity. If there is a devitalized tooth, therefore, between these two extremes, it is well to open the pulp-canals and explore with a smooth broach to discover if any of its roots are in relation with the floor, in which case, if the tooth is of little value, it may be extracted and an easy access gained. Where all the teeth are sound and have antagonists, the opening is more properly made between the adjoining roots of the first and second molars.

When conditions justify the extraction of a tooth, and this is done, an effort should be made to penetrate into the sinus with a dull probe. If this can be accomplished the opening so made may then be enlarged with a suitable bur in the dental engine. If the probe does not penetrate, a spear-pointed drill, about No. 5 on the bur gage, should first be used to find the way into the cavity, care being taken to use as little pressure as necessary, to avoid plunging into the

sinus with such momentum as to penetrate the orbital wall. If doubt exists as to whether the drill has entered the antrum, it may be readily ascertained by passing a dull flexible probe through the opening, when, if the drill has entered the nasal fossa, it may be felt by another probe passed through the nostril of the corresponding side, or if it has entered the cheek through the alveolar process, there will be a lack of such resistance to

brane and periosteum are pushed aside with the periosteotome, and the antrum is found with a spear-pointed drill and enlarged. Before enlarging it is well to excise the flaps of gum left by the crucial incision with scissors, or preferably with the tubular knife in the dental engine, as this leaves a clean wound which is less painful and has less tendency to fill with granulations. The foregoing method is also followed when the open-

FIG. 2.



the progress of the probe as a bony wall would cause. Having found the antrum with the drill, the opening may be enlarged as before noted. Burs convenient for this and other surgical purposes are on sale at the supply houses, the following kinds being the most useful: Round burs of graduated sizes from No. 10 to ¼ inch in diameter, pear burs No. 14 and ¼ inch, pointed fissure bur No. 14, bud bur ¼ inch, spear-pointed drill No. 5, Rollin's spiral implantation knife No. 2, Schamberg's large root-amputating bur, large size tubular knife, and Walker-Younger trephine No. 5. (Fig. 2.)

When the second bicuspid or first or second molar is missing, the puncture may be made through the alveolus at the edentulous point. A crucial incision is made to the bone, the mucous mem-

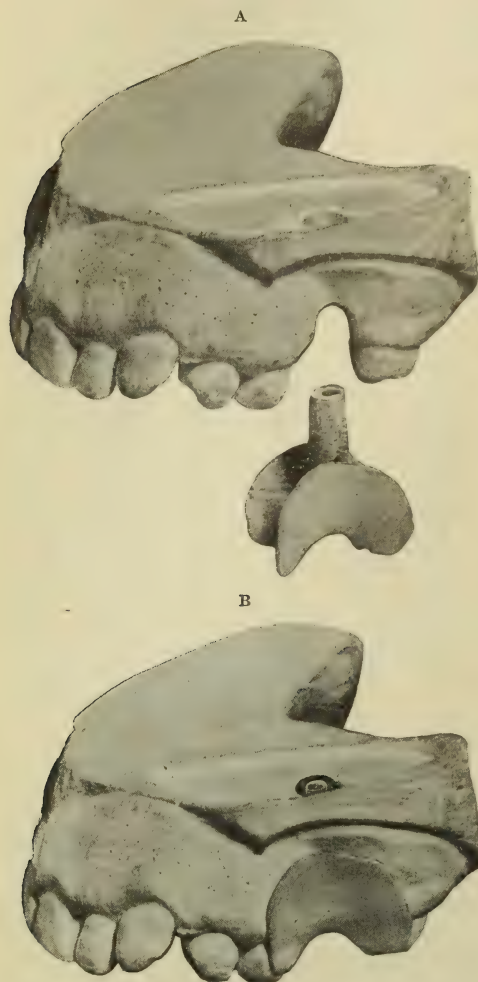
ing is made between the roots of the first and second molars.

After the opening is made of the required size, a probe is bent at various angles in order to explore the cavity to ascertain its dimensions and the possible presence of obstructions such as bony septa, unerupted teeth, etc. This having been done, a No. 14 French catheter of soft rubber should be introduced and attached to the tube of a fountain syringe of glass or enamel ware, and the antrum irrigated with a quart or more of normal salt solution. The head of the patient should be well forward, and the washings should be collected in a pus basin for future examination. Part of the irrigating fluid will pass through the normal or accessory antrum openings and out of the nostril, and part will return through the

exploratory opening and out through the mouth.

The irrigation should be continued until the fluid runs clear, after which the opening should be loosely packed with

FIG. 3.



Author's antrum cannula.

iodoform gauze. The irrigations and packing should be repeated daily until the pus is reduced to a minimum, when it may be gradually discontinued, allowing the wound to close by intermittently decreasing the size of the packing. In place of the gauze, in some cases a vulcanite piece may be made, which will answer for a combined plug and drainage

tube. An impression is taken with modeling compound about the second day after the operation. The model is then poured, and a plate made with one thickness of base-plate wax, extending well up to the cusps of the teeth adjoining the opening and saddling the alveolus. The plate is then removed from the model, and a cylinder of wax, a trifle smaller than the diameter of the opening and slightly longer than the thickness of the alveolar process as shown by the measurement previously taken with the probe, is stuck to its reverse side with a hot spatula at the point of the slight elevation indicating the opening. The plate is then cooled and tried in the mouth to verify the direction of the cylinder. After investing and vulcanizing, a canal is drilled through the cylinder as large as possible, and the plate is fitted to its place in the mouth. (Fig. 3.) Great care must be taken to have the end of the tube which enters the antrum just even with its floor; if it is higher it will not properly drain the cavity, and if it is too low, granulation will take place above it, thus filling the aperture. When the flow of pus has ceased and it is desired to close the puncture, the tube is filed off about one-eighth of an inch above the plate and the canal undercut and stopped with a gutta-percha filling. The plate should then be worn until the puncture is closed.

If at the end of three weeks there is not a perceptible diminution in the amount of pus secreted, some cause other than the treatment should be suspected. The frontal or the ethmoidal sinus may be the seat of the lesion causing the discharge, which finds its way into the antrum by way of the infundibulum and hiatus semilunaris, hence a rhinologist should be called in consultation, when, if no diagnosis of disease of these sinuses can be made, the failure of conservative treatment may be traced to a pyogenic condition of the antral mucous membrane, necrosis of its bony walls, or the inhibition of complete drainage by bony septa crossing its floor, any of which conditions calls for a radical operation at once.

The radical antrum operation may be performed through the nasal wall, but it seems to be universally admitted that the anterior wall offers the ideal location for its proper accomplishment. Most authorities advise that the initial incision be made over the canine fossa, but as this depression is often ill-defined, and when pronounced is frequently perilously near the nasal wall, the writer advises that it should be made between the canine fossa and the malar ridge, for this site is invariably directly over the antrum. Having located by digital examination the exact point of entrance, an incision of an inch and a half long, including the periosteum, should be made at the junction of the labial and alveolar mucous membrane. The knife should be held at an angle of forty-five degrees to the alveolar process, and the incision made with one long decisive movement. Caution should be exercised to have the incision exactly at the junction of the lip and gum, as, when this is accomplished, the lips of the wound lie together when the muscles of the face are at rest, and thus facilitate healing.

As soon as the incision is made, the assistant should sponge away the blood with gauze sponges held in the fingers, and when the first rush of blood has subsided the mucous membrane and periosteum should be dissected back with a periosteal elevator. The upper flap should be separated from the bone until the infra-orbital nerve is exposed, and the lower flap loosened from the alveolus for a short distance. At the point previously decided upon, an opening is now made through the bone with a spear-pointed drill and enlarged with a large bud bur, when a soft probe may be inserted to define the limits of the anterior wall. When this has been done the entire anterior wall is cut away with chisels, or more delicately with pear shaped burs in the engine, with a pulling motion toward the cheek. From this point the operation is a bloody one, and it is almost profitless to attempt to check the flow, but the assistant should be constantly watchful that the blood does not run back into the throat, as in so doing

it may enter the trachea and an obstructive pneumonia may ensue. The head of the patient should be held to one side and on a level or slightly lower than the shoulders, and the blood should be directed to flow out of the mouth with dry gauze sponges held in long sponge forceps. A tampon of non-absorbent cotton wrapped in gauze may be tied with a string to prevent its slipping back into the throat, and placed between the back of the tongue and the roof of the mouth, provided there is no obstruction to nasal breathing.

After the anterior wall has been removed, the finger may be introduced to examine the cavity, although in many instances this is impossible, owing to the bulging of the nasal wall. If the latter condition is found, a more thorough instrumental exploration should be made, in order to definitely fix on the mind the difficulties to be overcome. Having learned the exact anatomy of the interior of the sinus, including the location of every pocket and bony septum, the mucous membrane forming its lining should be removed in its entirety. For this purpose various sized ring curets should be used, stripping systematically one wall at a time and removing any necrotic bone, bony septa, or other obstructions which may be encountered with a spoon curet. As much of the débris as possible must be carried out with the curet, and this should be preserved for microscopical investigation.

Being satisfied with the curettage of the antrum, the hemorrhage may be stopped by tightly packing the cavity with one long strip of dry sterile gauze, beginning at the upper inner angle. When withdrawn this packing will bring with it most of the débris remaining from the curetting. A final examination is now made with the finger or with a dull probe to assure that all pathological tissue and obstructions have been removed, when the cavity should again be tightly packed, this time with iodoform gauze; the operation is then completed.

On the second day the packing is removed with a series of quick pulls and the antrum syringed with a quart or

more of normal salt solution, and re-packed a little less tightly than before. This treatment is repeated every other day, packing less tightly each time, until the gauze and irrigating fluid are both free from the presence of blood and pus, when the packing may be discontinued and the patient instructed in the use of the fountain syringe and soft rubber catheter, so that the antrum may be irrigated at home twice daily. The patient must be seen at intervals by the operator, the home treatment being omitted on the morning of the appointments, in order that the operator may irrigate to examine the washings. When the opening becomes so small that it will no longer admit the catheter, the edges should be slightly scarified to hasten granulation, and the home treatments discontinued. The patient must then be seen every four days, and the antrum flushed with a large syringe, avoiding the use of a tube large enough to discourage granulation at the opening. It is fre-

quently beneficial to make applications of ten per cent. chromic acid or four per cent. silver nitrate to encourage cell proliferation. When the opening has been reduced to the diameter of the lead in an ordinary pencil, treatment may be discontinued and the patient dismissed.

The Birmingham nasal douche used with normal salt solution will be found a useful adjunct to antral treatment, and should be employed daily by the patient, until the opening is completely obliterated. The general health and tone of the patient should be maintained with suitable tonics and laxatives. I have found Phillips' phospho-muriate of quinin and Clinton's "cascara active" to act quite happily for this purpose.

Much more might be said on this subject. In conclusion, however, let me insist that all work on the antrum should be done under the strictest aseptic precautions, and let me advise ether induction with chloroform sequence when prolonged anesthesia is necessary.

MANAGEMENT OF THE TEETH AND MOUTH FROM THE AGE OF SIX TO ADOLESCENCE.

By L. G. NOEL, M.D., D.D.S., Nashville, Tenn.

(Read before the National Dental Association, in general session, at the annual meeting, Birmingham, Ala., March 30, 1909.)

BEING aware of the impossibility of properly covering so much ground in the time usually allotted to an essayist on an occasion like this, and realizing that I am addressing an audience that is not only well posted in the text-book and journalistic literature of this subject, but well acquainted with its manifold phases and difficulties through actual experience in practice, and knowing furthermore that this familiarity with the practical details of each division of this subject will necessarily render you very critical, I feel somewhat timid about

presenting my own methods of practice; but I shall be content to be the subject of adverse criticism—yes, even ridicule—if in the discussion of this effort new light may come to some of us, and better methods of practice may follow.

I would refer you to a short paper in the January issue of the *Dental Brief* on "The Management of the Deciduous Teeth," which should be read in connection with this, and which brings us to the period of the eruption of the first permanent molars. This is a critical period, and the dentist will watch with

interest the eruption of these first permanent molars, which, from their great importance as props to the jaws and as factors in determining the position of the other teeth, have been termed the *principal* molars.

The period of eruption of the first permanent molars is subject to some variation, but is usually about the sixth year or a little later than the sixth year—often as late as six and a half. This is the period given by that careful observer, Dr. Black,* who notes cases of wide variance, and mentions one case in which the four first permanent molars were in occlusion at four years of age. The teaching of Dr. Black's latest text-book in regard to the normal position and special function of these molars† is so valuable that I must call your attention to it, but time will not permit me to invade the field of orthodontia. I can only stress the great importance of correct occlusion of these molars, and cite the above-mentioned article, in which it has been so forcibly set forth.

The growth of the roots of the permanent teeth has been carefully studied by Dr. Black, by Dr. C. N. Peirce, and others,‡ and the work they have done on this subject is a safe guide to the practitioner as to the possibilities of pulp-removal and root-filling in young subjects. The illustrations they have made to demonstrate root-growth should be indelibly fixed upon the memory; furthermore, they should be enlarged and hung up in every dental office for reference.

If children are placed under the care of a competent dentist (one who shall have charge of them without change or interference) it will generally be his fault if carious cavities become deep enough to cause the death of a pulp; for if he does his duty toward the child, he will insist upon seeing it often enough to fill all defective fissures and carious spots in the enamel sufficiently early to prevent pulp-irritation. His whole treat-

ment and instruction should be directed to the maintenance of oral cleanliness and the prevention of decay. If this is accomplished—as I have seen in many cases—the dentist should not be called upon to essay the impossible either in root-filling or contour restoration, except in cases of accident or fracture, for all necessary operations will be simple and easy of accomplishment.

The stomatologist on whom is placed this sacred trust, the continuous care of the teeth of growing children, must be a man of experience and ripe judgment, not a faddist and experimenter.

CAVITIES IN FIRST PERMANENT MOLARS.

If the deciduous teeth have been properly cared for and oral cleanliness has been maintained, no caries should attack the mesial surfaces of the first permanent molars, but owing to structural defects we shall usually find the disease attacking the fissures of their occlusal surfaces, and sometimes the buccal pits of the lower molars.

Occlusal and buccal cavities. These cavities should be carefully excavated, and as a rule should be filled with the best obtainable cement. I am now experimenting cautiously with the silicate cements, and am at present favorably impressed with them in shallow non-sensitive cavities on the occlusal and buccal surfaces of these first molars. Many worthless zinc phosphate cements are now being sold as the *best*, some of which stain the teeth like amalgam if worked with steel instruments.

The experienced operator will know his material, and if there be much sensitivity of the dentin he will probably decide to fill these occlusal and buccal cavities of the first permanent molars with zinc oxyphosphate. The rubber dam should be adjusted, sensitive dentin coated with a suitable varnish, and the oxyphosphate allowed to set fully before removing the dam. The therapeutic effect of cements in these cases is to cause tubular calcification, an effect much to be desired before introducing gold fillings.

* "Operative Dentistry," vol. i, pp. 259, 260.

† *Ibid.*, p. 263.

‡ *Ibid.*, pp. 258, 259. Also Burchard's "Dental Pathology and Therapeutics," p. 164.

Mesial cavities. When the mesial surfaces of the first permanent molars require filling before the bicuspid have advanced sufficiently to obstruct access, it is the custom of many eminent practitioners to fill with gold when the child is manageable, urging this time as an opportunity to be eagerly seized before it is gone forever. Some eminent writers have not only urged filling with gold at this tender age, but have also recommended extension for prevention.

I should not expect to have one of my young patients return to me for another operation after such treatment, but this is not the chief reason for its being disapproved of.

The terminal nerve filaments are more sensitive at the dento-enamel junction than in any other portion of the dentin, and in placing a gold filling there at that tender age we run great risk of setting up pulp-irritation. The risk is greatly increased when the surface is extended. These spots of decay should be prepared if possible as simple cavities *i.e.* without extension to the occlusal surface, and filled with either gutta-percha or cement, the usual care being taken to adjust the dam and to varnish the cavity if it is hypersensitive. For gutta-percha work a varnish of resin dissolved in chloroform will be found most useful, rendering the surface adhesive. For cement, cavitine or gum mastic may be used.

If, after six months or one year, a cement filling on one of these surfaces shows wasting, a gold filling may be substituted provided the patient is manageable and the access is good.

CAVITIES IN INCISORS.

Lingual cavities. The lingual pits in the upper lateral incisors may be defective, and require filling shortly after eruption. Here the excavation should be most carefully conducted, for there is much danger of exposing the pulp or of irritating it by a too near approach. A good cement is the safest material, and should be worked with the same caution as mentioned above.

Labial cavities. If proper care as to diet and oral cleanliness has been taken, we should not find caries on the labial or approximal surfaces of the incisors before the eruption of the canines, but alas, how often do we find that our warnings have been disregarded! or it may be that the little patient comes to us for the first time for the treatment of cavities on these surfaces.

When the labial surfaces are carious, a carefully selected silicate cement will prove the most esthetic material, and—if our confidence be not misplaced—the most lasting. It must be remembered that these silicate cements are highly irritating to the pulp, and therefore the cavity should be varnished with cavitine, or some other good stainless varnish.

Approximal cavities. The dentist is sometimes greatly shocked when after a short interval his patient, over whom he thinks he is keeping watch and ward, returns with dangerously large cavities in the approximal surfaces of the incisors. Sometimes it is difficult to discover the cause or causes for this sudden destruction of tooth structure, but it will usually be traced to errors of diet and habits. It is generally traceable to over-indulgence in sweets, too much sugar in the food, too much syrup at table, and indulgence in candies between meals. Such habits encourage bacterial growths in the mouth, and favor the progress of caries; but inquiry will often disclose other and greater violations of hygienic laws, such as too much forcing at school, insufficient outdoor exercise, insufficient supply of oxygen in sleeping apartments, irregularity of meals, and indulgence in rich lunches between meals.

All these errors tend to vitiate the oral fluids, to favor bacterial growths, and to lower the vital resistance of the individual. It is the imperative duty of the dentist to seek out and correct these hygienic errors, for upon this will depend his future success in his practice with that family, and besides, to a great extent, their health and happiness. These approximal cavities should be reached by forcing the teeth apart with rubber, tapes, cardboard, or wooden

wedges, and the excavation should if possible be conducted so as to leave the enamel margins unbroken to protect the fillings from friction.

The cavities should be filled with gutta-percha, if they be hidden well from view, or with cement. If with the latter material, a colorless varnish like cavi-tine should be applied to the surfaces of the cavities before introducing the cement.

I have high hopes of the silicate cements, but they are new, and until they have been further tested should be used with great caution. My own experience leads me to consider them dangerously irritating to pulps, and knowing this, I am cautious to protect them with a varnish or a layer of zinc phosphate. Gutta-percha has a good record through many years of service, and when protected by the knuckling together of the teeth I have known it to stand for twelve or fifteen years.

Insist upon *frequent examinations*. The dentist should have an understanding with parents that the children shall be brought in for examination not less than four times per annum. These periods are best marked by the changing seasons. These opportunities for removing stains and bacterial plaques are to be seized with eagerness by the dentist, and he must not fail to correct faulty habits that in his judgment menace the welfare of the teeth and general health.

During this time, from the ninth to the twelfth year, the deciduous molars and canines are giving place to the bicuspid and canines, and the jaws are lengthening backward to give place to the permanent molars, while at the same time there is a general development of all the bones of the face.

At about the age of twelve we expect the second permanent molars to appear—contemporaries, as it were, of the canines.

FISSURE CAVITIES IN THE BICUSPIDS.

The bicuspid frequently present faulty occlusal fissures that early show signs of decay. These fissures should be carefully excavated as soon as decay

is apparent, and should be filled with the best cement that can be obtained.

Here, again, I have high hopes of the silicate cements, and some cases which I have treated with this material show no perceptible wasting after a test of twelve months. Good oxyphosphate cements would probably show as well, and I do not consider this a decisive test.

At this age, many of our patients are sufficiently manageable for the introduction of gold or tin, but until the growth of the roots is complete, I prefer to combat caries with cements. The residence and circumstances of my patient might cause me to change materials. For those patients whose residence will permit the frequent examinations mentioned above, I prefer the cements.

THE MOST IMPORTANT AGE FOR CORRECTING IRREGULARITIES.

At about the age of twelve the canines and the second molars put in their appearance, and the dentist who has conducted the young patient thus far will be much concerned about alignment and occlusion.

Many cases will present irregularities of arrangement, calling for mechanical devices for correcting these defects, and mature judgment should first be sought, then prompt action taken to remedy such defects.

As before remarked, I do not propose to enter the field of orthodontia, but I must insist upon the importance of correct alignment and occlusion of the teeth, with the need of expanding some arches in order to obtain this, and urge the general practitioner to seek the aid of the specialist in difficult cases, to the end of health, usefulness, and beauty. This is perhaps the most important age for correcting defects of arrangement, and the opportunity should be considered most precious.

OCCLUSAL CAVITIES IN SECOND PERMANENT MOLARS.

The second permanent molars frequently present defects in their occlusal

fissures, and in the buccal pits of the lower ones, that should be treated early with cement. The same reasons set forth in speaking of the bicuspid will apply here.

My desire to prevent deep and destructive caries is so strong that I frequently fill notably defective fissures with cement before these teeth are in occlusion, watching and re-filling more perfectly when it becomes possible to apply the dam.

The period from the twelfth to the fourteenth year requires extraordinary vigilance on the part of the dentist, for it is usually a period of rapid growth, of animal-like carelessness on the part of children, of abundant rosy saliva full of mucin—in short, a period presenting every condition that favors fermentation in the oral cavity.

PREVENTION OF DECAY.

Cement fillings are apt to be of short duration under these conditions, requiring frequent renewals. It is the duty of the dentist to make these things clear to parents, and insist upon regular attendance upon the dentist, aided by redoubled home care.

By these means we may be able to avert the disaster of approximal decay, but the dentist should be ever on the alert for evidences of the beginnings of enamel softening on the approximal points of contact. If detected early, it may be arrested by a thorough polishing with wood points or with fine strips applied so as not to flatten the points of contact, only removing the etched portions of enamel without cutting to the dentin or destroying the natural rotundity. This can only be accomplished with wood polishers and strips. Disks in the dental engine are sure to flatten the surfaces, inviting a recurrence of the trouble.

Incipient decay upon the enamel of the lower teeth, and in all situations out of sight, should, after such polishing as above described, be treated with silver nitrate. In treating approximal surfaces the dam should be applied and a satu-

rated solution of silver nitrate applied with sufficient exposure to light to secure a deposition of silver upon the surface.

The age of puberty is, as a rule, early enough to commence gold operations—a rule admitting of some few exceptions—and these should be performed only upon such teeth as have about completed the growth of their roots. Strict adherence to this idea will, at first, almost limit gold fillings to the first permanent molars, for there will be few cases where we shall find it wise to use gold in the incisors.

Wasting cement fillings in the first molars may now be replaced with gold, and new cavities of moderate depth in these teeth may be treated in like manner.

Passing on to the age of fifteen and sixteen, we have to deal with years of similar susceptibility to dental caries, and our vigilance should never relax.

In spite of all our efforts, cavities will sometimes be found on the approximal surfaces of the incisors and canines, and on the approximal surfaces of the bicuspid. These cavities between the incisors and canines should be treated in the manner above described, filling them with gutta-percha or cements. Approximal cavities upon the bicuspid will usually have to be reached by cutting from the occlusal surfaces, and the preparation of such cavities should not be undertaken without first obtaining sufficient separation to get a good view of the surfaces involved. The softened area should be fully embraced in the cavities, which should be extended buccally, lingually, and gingivally until the area of safety is reached. If the teeth are hypersensitive they should be filled with cements guarded at the gingival margin with gutta-percha. These should be permitted to remain—under constant surveillance—until a wasting demands their removal, when they must be permanently filled with gold.

The treatment of hypersensitive cavities with cements, and with combinations of cements (zinc oxyphosphates) and gutta-percha, is worth all that it costs the patient in the beneficent effect

produced upon the dentin and pulps of the teeth thus treated. Hyperemia of the pulp is thus allayed and tubular calcification of dentin is thus brought about, before the teeth are subjected to the shocks of thermal and electrical irritation induced by metallic fillings.

Eagerness to introduce a so-called permanent filling has caused the loss of many a tooth. Cavities on the distal surfaces of the second bicuspid and mesial surfaces of the molars will sometimes be met with as early as fifteen or sixteen, and later. These should have the same treatment as that outlined above.

If the teeth are hypersensitive, and the oral conditions are such as to seemingly favor rapid and destructive caries, they should be first treated with combination fillings, either of cement and gutta-percha or cement and amalgam. In lower teeth and when the filling is out of view, the latter is preferable.

Caries at from sixteen to eighteen years. Approximal decay is often met with in the molar teeth as early as sixteen to eighteen years of age. When the structure is markedly faulty, and caries is riotous in the mouth, the wise dentist who values his own reputation and his patient's teeth will follow about the same line of treatment as set forth above, with the exception that amalgam will probably be used as the permanent filling.

Buccal cavities in the molar teeth may be filled with gutta-percha until it is deemed wise to risk a permanent filling

of amalgam or gold. Cavities on the contact surfaces of the second and third molars are usually best filled with amalgam, and occlusal cavities when they occur will generally be treated with the same material.

In speaking of cements and amalgams, I have been unable to refer to those which I have found reliable, time and space forbidding. Suffice it to say that many of the materials offered by dealers are worthless, and the dentist must *know* that he is using the best that can be obtained.

From eighteenth to twenty-first years. From the eighteenth to the twenty-first year the dentist may replace with gold all cement fillings that are wasting or otherwise defective, provided conditions are such in his judgment as to warrant such procedure. Simple approximal cavities in the incisor teeth should be approached from the lingual aspect by first obtaining a free separation, then a slight beveling or planing away of the fragile enamel from the lingual margin. The labial enamel should be so conserved as to conceal the gold from view.

When possible—and this is so with all simple cavities—these approximal cavities should be filled with non-cohesive gold.

This is the time for permanent fillings of gold wherever indicated; for extension for prevention within reasonable limits when required, and for so-called permanent operations wherever plastics are found wasting.

ALL-ALUMINUM CAST PLATES, USING PURE ALUMINUM.

By FRANK H. KELLY, Ph.C., D.D.S., Chicago, Ill.

ONE of the great disadvantages of aluminum plates with the teeth vulcanized upon the base is the danger of the rubber pulling away from the plate. The so-called eating away of the aluminum is caused by impurities which may arise from many causes on account of the ease with which it will alloy when in a molten condition.

I have been able to find traces of iron in aluminum which had been melted in an iron ladle. I have also found traces of iron in aluminum which had been melted in a plaster dish and stirred with an iron rod. These are just two ways in which the metal may become unserviceable in the mouth after casting, but when the metal is put into the mouth in a chemically pure condition, I do not believe that it will in any way be affected.

In casting the aluminum, checking of the teeth is absolutely avoidable if care is taken, as I have used facings, gum sections, and diatoric teeth without a single accident, the only requirement being that you do not hurry, but take your time.

As to the technique, I use a centrifugal force machine with a large-size bucket. First, pour the model in silex and plaster, as for ordinary inlay work; set up the teeth in the same way as for rubber plates, except that inlay wax should be used. I have formerly used the stick inlay wax, making it into sheets, but the supply houses now carry a wax especially prepared and molded for such work, which is much better than the ordinary inlay wax. Having fitted the case I smooth the wax with chloroform, then use a hot blast. Next, cut the case from the articulator, and trim off as much of the model as possible. If the case is a large one, two sprue-holes are desirable. Make the sprue-holes in the top and perpendicularly to the palate, as in this posi-

tion the occlusal surfaces of the teeth sit firmly in the bottom of the mold, and there is no danger of the teeth falling out of place during the casting. A small round piece of wax is often convenient for making the sprue, on account of its being easily bendable.

After boring the sprue-holes and putting in the sprues, invest the case with any good investment in your casting bucket, and allow it to set overnight. Next cut the investment into a saucer, shape it around the sprue, and slowly burn out the wax. The burning-out process should consume about four hours. Then heat the case thoroughly but not rapidly, remembering that there is porcelain within the investment; next place an excess of metal over the sprue, melt with a blowpipe, and whirl the case for about two minutes. Aluminum retains the heat for a considerable length of time, and it must be held in place until it is hardened sufficiently to stay against the walls of the model. The case should remain in the flame for half an hour, gradually cooling, then the fire should be turned out and the case left in the investment for about two hours. Do not break the case out while the investment is still warm. If gums are necessary, undercuts can be made in the wax, and pink rubber vulcanized on after the case is cast.

One of the main causes of failure in plate casting is the insufficient burning out of the wax. Complete burning out is necessary for two reasons: (1) The metal cannot otherwise be forced into all parts of the mold, and (2) after the wax is dried, the inside of the mold becomes coated with a carbon deposit, which remains until it is combined with oxygen from the air and passes off as carbon dioxide and carbon monoxide. If the case

is heated and cast before complete combustion has taken place, the carbon comes in contact with the platinum pins of the teeth and makes them brittle.

The most common causes of checking are too rapid heating and cooling, and not having heated the teeth in the mold as nearly to the temperature of the molten metal as is possible. Polished aluminum is estimated to be as hard as soft iron, and for this reason it is convenient in very short bites to have the patient bite into the wax with the posterior teeth; then cast the teeth in aluminum. When a patient has the habit of breaking teeth off from the plate, it is

advisable to use facings, backed with aluminum. Aluminum repairs are easy, owing to the fact that only one or two teeth are handled, and only a small amount of wax has to be burned out. To repair a broken tooth, cut out a small section of the plate, wax in a new tooth, put a small sprue into the wax, invest, and proceed as with any ordinary inlay.

To many dentists the finishing of aluminum seems to offer difficulties, on account of its gumming up the finishing instruments, but, in closing, I simply wish to state that, if handled rightly, aluminum is easy to finish and takes a very high and lasting polish.

CAVITY PREPARATION, BASED ON THE PATHOLOGY OF DENTAL CARIES.

By **ARTHUR D. BLACK, B.S., M.D., D.D.S., Chicago, Ill.**

(Read before the Connecticut State Dental Society, at its annual meeting, Waterbury,
April 20, 1909.)

THE dentist who understands the present known pathology of dental caries and the present known physical properties of filling materials, and develops the judgment and ability to execute his work accordingly, should be able to place fillings the majority of which will last throughout the lives of his patients. What we most need in the dental profession today is not so much the development of more scientific information as a better assimilation and practical application of what we have. There is the constant cry for the so-called "practical," uttered by men who are generally unwilling to read with a fair mind, to understand with good judgment, or to modify methods of procedure to make fair clinical tests of the work of our really scientific men.

It is often stated that our farmers are slower to accept and adopt scientific experimental work than almost any other

class of men, and it has been necessary for our state agricultural experiment stations to demonstrate by actual field results, extending over years and years, that certain changes in methods are necessary. These stations in the corn-belt states have shown the farmers that fields side by side, with exactly the same soil and practically the same amount of labor, can be made to produce anywhere from thirty to a hundred bushels of corn to the acre. While these facts have been known for a decade or more by most scientific farmers, it has taken years of actual results to induce the average farmer to change his methods. Even now, it is generally necessary in each community that some ultra-progressive man adopt advanced methods while his neighbors laugh at his "foolish notions," and demonstrate that the methods are right. When in the first year he raises half again as much corn per acre as his

neighbors they call it an accident, when he does better the second year they begin to realize that there may be something in it, and after about the third year they all do likewise.

The dental profession has been slower than the farmers in accepting the known facts relative to the pathology of caries, and this I believe is largely because we have not had the results of "experiment stations" presented in definite form. We must have tabulations of actual results, covering thousands of operations by many men, extending over a number of years, before our men will really begin to associate pathology with treatment as they should. If it is possible, as the writer believes, that the majority of filling operations may be really permanent, and the accomplishment of such operations requires less time and generally less effort than is now expended by the average practitioner, it will be a decided advantage to patients and to practitioners, both from the physical and the economic standpoint. It has been proved that the farmer can, by following scientific methods, raise twice or three times as much grain without material increase in his labor, and the writer believes it to be equally true that our filling operations may, by the adoption of reasonable methods of procedure based on pathology, be made to last two or three times as long, and that the operations may at the same time be performed with less pain to patients, with less difficulty for the operator, and in much less time.

This paper will be limited to a discussion of the preparation of proximal cavities in the bicuspid and molars, and for these your attention will be directed principally to the outline form of such cavities, or the positions of the various margins, based on pathology. In this connection we will consider—(1) The involvement of enamel by caries, (2) the involvement of dentin by caries, and (3) the relation of interproximal gum septum to caries.

For the purposes of this paper it will be necessary to mention only very briefly certain factors in the bacteriology of caries: (1) The micro-organisms that

produce caries are always present in the mouths of all persons. (2) Some persons are susceptible to caries and others are not. (3) The conditions of susceptibility and immunity may vary in individuals at different periods of life. (4) The controlling factor seems to be a condition of the saliva which so affects the life-processes of the organisms that caries may or may not result. So long as we do not know definitely what the salivary condition may be, we must base our treatment on the known etiology and the manifestations of the pathological process which may be observed clinically, and by examinations of sections of extracted teeth. We know that decay in the proximal surfaces of bicuspid and molars practically always begins just a little toward the gingival portion of the contact point, and not elsewhere. Any one may convince himself of this by the examination of a few hundred teeth having small areas of (beginning) proximal decay. We know that the enamel of the entire proximal surface is calcified as a single lobe; that there is no depression, defect, or weak spot in it; that it is smooth, perfectly formed enamel. We know that the carious process in the enamel is effected by an acid produced by certain micro-organisms. This acid, if dissipated in the saliva, does not produce decay; it must be confined to the particular spot on the surface of the enamel for a considerable time. If this were not so, decay would begin elsewhere than at the particular spot. The enamel, as is well known, is composed of rods held together by a cementing substance, and this cementing substance is dissolved more rapidly by the acid than are the rods. The cementing substance may be dissolved from between the rods through the entire thickness of the enamel without the rods being very much affected, and without any of them being displaced. If we examine a tooth so affected there is no apparent change in its contour, and often, if the tooth be moist, the eye will be unable to detect the injury. If, however, the surface be dried, the affected enamel will appear white. There is no cavity,

but there is a decayed area, the surface extent of which is shown by a dull white spot. The enamel of this spot is not glossy; it is, in fact, somewhat rough on examination with a sharp instrument, which will penetrate it under slight pressure.

These white spots gradually grow larger in certain directions, particularly toward the buccal and the lingual, and gradually extend more deeply into the enamel; the area of enamel so affected has the shape of a cone, with the base of the cone on the surface and its apex toward the dentin. If we cut a section through this enamel in any plane parallel to the direction of the rods, the shape of the affected area will be triangular, with the apex of the triangle toward the dentin and its base at the surface.

The portion of the proximal surface lying toward the occlusal surface of the contact point is immune to decay, because decay is practically never found to begin there, nor to spread there on the surface of the enamel. The lingual and buccal margins of the proximal surface, constituting the angles of the tooth, are similarly immune for the same reasons. Decay never begins or spreads on the surface under the free margin of the healthy gum tissue. These are facts that anyone may verify by observation. What, then, is the pathological condition with which we have to deal in each such case? We have a surface in the central portion of which decay begins and gradually spreads, but practically never reaches to any of the boundaries. We must conclude that the point of greatest liability to decay is this central point, and that there is a constantly lessening variation of liability as we approach the margins.

As long as the interproximal gum septum occupies its normal or nearly its normal position, the caries must spread toward the buccal and lingual surfaces, following closely the free margin of the gingivæ. The extent of this spreading is modified by the convexity of the proximating surfaces; the more convex the surfaces, the narrower the spreading of the decay. We must therefore con-

clude that the width of space between the two teeth (the embrasures) deserves serious consideration—that the surface spreading of decay does not go beyond the line where the surfaces of the two teeth are a certain distance apart.

If a filling is placed in such a surface, restoring its exact contour, there will be the same accumulation and growth of organisms as previously occurred on the surface of the enamel, and the limit of the spreading of this growth on the filling and tooth-surface will be governed by exactly the same laws as was the previous growth on the enamel. If the margins of the filling have been placed in such positions that the growth of micro-organisms may extend to the surface of the enamel beyond, the acid will surely affect that enamel, and there will be a recurrence of decay. If we recognize these facts, it is surely our plain duty, when we prepare such a cavity, no matter how slight the extent of the injury to the enamel may be at the time, to place the margins in such positions that there can be no recurrence of decay on the surface of the enamel. If we do not recognize the facts stated above, it is because we are not awake to the possibilities of careful observation.

After the acid has penetrated the enamel, its progress in the dentin is modified by the structure of the latter. In all cases there will be a lateral penetration of the dentin immediately under the surface of the enamel, and a direct penetration along the tubules toward the pulp. This results in the destruction of a more or less cone-shaped area of dentin, with the base of the cone against the enamel and its apex toward the pulp. The width of the base of this cone is determined by the structure of the dentin. If there are numerous anastomoses between the tubules at their outer ends, it will be easy for the acid to spread laterally, and the base of the cone will be large. If the dentin is more perfectly formed, giving the acid less opportunity to spread laterally, the base of the cone will be small.

It must be remembered that from the original point of beginning on the surface of the enamel, there is a spreading

of caries on the surface while the penetration of the enamel is progressing; therefore often a very considerable surface area is involved before the acid reaches the dentin. Lateral decay in the dentin, resulting in the undermining of the enamel, must necessarily first undermine the enamel that is already injured on its surface, and whether the lateral decay in the dentin undermines the enamel not involved on its surface will necessarily depend on three factors: The conditions governing surface extensions on the enamel, the conditions governing rapidity of lateral extensions in the dentin, and the time elapsed after the dentin was first penetrated. There is a limit to surface extensions, as mentioned above, but there is no limit to extension in the dentin, there being a gradual progress as time passes. We may therefore have a surface extension to its limits, without the dentin being involved at all; we may have a very small area of surface involved with extensive decay in the dentin, or any combination of conditions between these two.

The enamel is, as we know, weak and friable if the underlying dentin is decayed, and all such enamel should be cut away, except for esthetic reasons in certain positions where no stress may be brought to bear upon it. I would therefore make two rules to govern me in placing the margins of cavities occurring in these surfaces: (1) Without regard for the extent of the decay in either the enamel or dentin, I should cut away sufficient tooth-structure, either sound or decayed, to place the margins in positions where recurrence of decay cannot occur on the surface of the surrounding enamel. (2) I should place the margins as much farther in any direction as might be required by the removal of all enamel undermined by decay in the dentin.

I wish to emphasize several points in which the profession can materially improve its efficiency in the treatment of such caries. In the majority of cases, fillings should be inserted months before the decay is discovered by the present methods of making examinations of the teeth. It is the general practice not to

insert fillings until there are actual cavities in the teeth. This is wrong, for the perfectly evident reason that the dentin is often seriously involved before there is any cavity in the tooth, before any enamel rods have fallen away, when only the cementing substance between the rods is dissolved. We should discover such decay before there are any cavities, by drying the teeth so that we may possibly see the whitened areas of decay, by the use of the silk floss, by using strong, small, sharply curved explorers that may be made to penetrate the enamel that has been softened, and often by the use of a separator in order to secure better vision and better opportunity for using explorers. We often have the opportunity to examine many such surfaces with the rubber dam on, in cases in which the dam has been placed for treatments or filling operations in neighboring teeth.

There are a good many factors that might modify the width of cutting in any particular case, such as the age of the patient, our estimate of his susceptibility to caries, the appearance of the decayed area, the number of other cavities or fillings, the care of the teeth by the patient, etc. Owing to the fact that these only indicate past or present conditions and cannot be definitely relied upon as a basis for the future, they should generally have little weight in forming our decision. We can never be certain whether the patient who is immune or nearly immune today will not be extremely susceptible a year hence. We should constantly bear in mind, however, that the most essential thing is to have sufficient space between the two approximating surfaces at the line of the margin, and we may often obtain this by separating the teeth and making the filling more convex than the surface of the tooth originally was. We may in this way very materially limit the width of the cavity, and yet have the margins in safe positions.

We should remember that the interproximal gingivæ normally fill, or very nearly fill, the space between the teeth in the form of an arch with its highest

point close to the contact point, and the surface extension of caries will follow the margin of this tissue, but will not extend under it. To apply the rules above mentioned in practice it is not often necessary to cut away sound tooth-structure, even in cases in which cavities are discovered early, except in two positions, namely, at the gingivo-buccal and the gingivo-lingual angles of the cavity. If the proximal cavity, which is very frequently prepared with a rounded gingival margin, is made with sharp angles at the junction of the gingival with the buccal and lingual walls, the life of all fillings of this class would probably be at least doubled, for this cutting would remove the bulk of the most susceptible enamel remaining.

Particular attention is called to the fact that what has been said refers only to the surface outline of cavities, and has nothing whatever to do with the depth of cutting. The depth of cutting is governed entirely by the extent of the decay in the dentin. When decay of the dentin does not require it, no dentin should ever be removed to a greater depth than 1 mm. (about the length of the head of a No. 35 inverted-cone bur), and often not so deep. This is another reason why these cavities should be discovered early, before there is any decay of the dentin.

In the preparation of cavities of this class, it should be the rule to cut a step in the occlusal surface to insure the proper retention form for the filling, to give better opportunity for placing a good filling, and to eliminate the making of either a frail margin of the filling or of leaving a frail wall of enamel at the occlusal margin, as would be necessary in a simple approximal filling.

One of the most important factors in the prevention of recurrence of decay in such cases is the proper restoration of the contact point. If we may judge from our observation of the work of many operators, most of them do not trim and finish proximal fillings to the proper form. We should test with waxed silk floss the contact of every filling with the proximating tooth. There should be a posi-

tive rounded contact, the same as we find in normal dentures. The silk should snap through, showing a single touch point, it should not drag anywhere, and should not be frayed. It should snap through in the same way from the gingival border to the occlusal surface. After the ligature is passed through from the occlusal surface to the gingival border, the ends should be held together in the occlusal direction and in the buccal direction, and in both positions the strands should be closely enough together to show that contact really takes place only at one point.

Failure to restore a proper contact frequently results in a recurrence of caries at the gingival border of the filling, no matter where the margins were placed, because, if food particles are caught between the teeth, it is only a question of time until the interproximal gingivæ will be so injured that the gingival margin of the filling will be exposed. Failure to restore a proper contact also jeopardizes the surface of the proximating tooth. On the other hand, extra separation and a prominent contact which increases the width of the embrasures not only permits the making of a narrower filling, but reduces on the surface of the proximating tooth the area that is liable to decay. If those who have not paid special attention to proper contact restoration will keep careful records for a very few years, they will observe that proximal decay frequently occurs solely on account of their neglect.

In closing, attention is called to the fact that many cases of recurrence of decay result from failures in the manipulation of filling materials or in the preparation of enamel walls, no matter where the cavity margins are placed. While it is impossible to discuss that phase of the subject in this paper, it is mentioned in order to emphasize the fact that recurrences due to failures in manipulation should be recognized as such. These do not begin on the surface of the enamel, unless the cavity be overfilled, leaving a ledge on which deposits may remain in contact with the enamel. In cases of failure of proper adaptation of the material to the walls, or of failure to make

the filling flush with the enamel margins, or of failure to properly prepare the enamel walls, short ends of rods being left at the surface that later fall away, the recurrence begins on the wall of the cavity, not on the surface of the tooth. All these considerations may be briefly summed up as follows:

(1) Practitioners of dentistry do not seem to realize the direct relation that exists between the pathological processes involved and their treatment.

(2) We need records of operations, carefully kept by many men over a period of years, to convince the profession of the possibilities of improvement in the service given by fillings placed under various methods.

(3) Proximal decay begins in definite positions and spreads on the surface in definite directions, but within certain limits.

(4) Proximal decay often causes extensive injuries to the enamel before there is an actual cavity.

(5) The progress of decay in the dentin proceeds laterally under the enamel and directly toward the pulp, the structure of the dentin modifying the extent of the lateral decay.

(6) Decay spreads on the surface of the enamel within certain limits, but there is no limit to the spreading in the dentin immediately under the enamel. Both processes may be going on at the same time or separately, and either may have involved the more enamel at the particular time of observation.

(7) Margins of cavities should be laid in positions where recurrence of decay cannot occur on the surface of surrounding enamel.

(8) All enamel undermined by decay in dentin should be removed, even though the margins are carried beyond the positions just mentioned.

(9) Proximal decay should be discovered and fillings should be inserted much earlier than is customary.

(10) The most essential point in the location of marginal lines is to have sufficient space between the proximating teeth at the positions of those lines to insure against recurrence of decay.

(11) Extra separation and a prominent contact will materially lessen the necessary bucco-lingual width of cavities.

(12) The most essential modification in the customary method of preparation of cavities should consist in the squaring out of the gingivo-buccal and gingivo-lingual angles.

(13) Width of surface cutting has no relation to depth of cutting in the dentin. Deep cutting of dentin should be avoided except when decay renders it necessary.

(14) It is very important to restore a properly rounded contact.

(15) Failures due to the manipulation of filling materials or to the faulty preparation of enamel walls should not be confused with recurrences due to failures in properly locating the enamel margins.

AN ANTISEPTIC CEMENT.

By Dr. CARROLL B. ADAMS, Bridgeport, Conn.

(Read before the Connecticut State Dental Association, at its annual meeting, Waterbury, April 20, 1909.)

THE cause which has led the author to the consideration of this subject is familiar to dentists, that is, the putrid condition of all zinc phosphate used for setting crowns or for fillings after having been in the mouth a longer or shorter time.

Zinc phosphate is sufficiently porous to absorb liquids from the mouth, and these liquids, carrying in solution organic matter necessarily infected, produce a condition from which decomposition and the putridity referred to result, producing infection of the susceptible adjacent tissues. I believe that the cause of death of tooth-pulps under zinc phosphate cappings is to be looked for in this infection rather than in the phosphoric acid to which it has been ascribed, as it is also a cause of infection of the gum margins.

In endeavoring to combat the situation the following deductions have been drawn. Find a material that may be added to the cement which will meet the following requirements: It must not be decomposed by phosphoric acid, must not be soluble in water, must not be volatile, and must be a germicide, or at least antiseptic.

After a consideration of various substances, thymol has been selected as the best. Thymol is a camphor of the oil of thyme, scarcely soluble in water, but readily soluble in alcohol, and a powerful antiseptic.

The method presented to you consists in taking the powder of the zinc phosphate cement and triturating it with 5 per cent. to 10 per cent. of its weight of thymol. When required for use, the powder and liquid are mixed and applied in the usual way.

The application of this cement is suitable in all cases where cement has been indicated heretofore; it has been successfully used in the following ways:

In deep cavities in deciduous teeth, when the little patient will tolerate only short operations and the pulp has been approached too closely to permit the insertion of an amalgam filling, this cement may be placed in position and coated with a quickly drying varnish, giving good results.

As a pulp-capping it has given much better results than any other material which I have been able to obtain. In twelve years' use of this cement as a pulp-capping I have found only three cases where the pulps had decomposed, but they were not putrid.

This cement is indicated as a foundation in very large and deep cavities when gold or amalgam is to be used. In this class of cases it is not always possible or practical to remove all of the affected dentin, and the use of this cement has given very gratifying results. From this I draw the deduction that the antiseptic properties of the cement overcome the infection in the tubules of dentin, thereby preventing irritation and stimulation of the odontoblasts and the formation of secondary dentin.

After treating and filling the pulp-canals, this cement should be used as a foundation for gold or amalgam fillings.

The buccal cavities of molars have been a source of trouble to most operators. In the mouths of patients where fermentation is nearly constant, buccal cavities with metal fillings soon show recurrence of decay at the cervical margin, or if gutta-percha is used, expansion re-

sults, which is not pleasing. In such cases an antiseptic cement has given good results as a more or less permanent filling, apparently for the following reasons: The antiseptic properties reduce or prevent fermentation in the immediate locality, thereby hindering the formation of lactic acid.

The last but not the least of the applications of this cement is for setting crowns and bridges.

The addition of thymol to the cement does not change its working qualities or density. The durability of this material in exposed fillings is apparently enhanced

for the reason before stated, namely, that fermentation and formation of lactic acid are reduced. In mouths where milk of magnesia has been used and a nearly alkaline condition is maintained, the durability of this cement is remarkable.

As to preserving this cement in the office, it is well to keep the bottles in a warm place, but as thymol melts at 90° F., ordinary room temperature must not be much exceeded.

"An antiseptic cement" is not intended for permanent fillings, but for the uses described, and may prove itself a valuable accessory in dental operations.

CORRESPONDENCE.

THE FUYT METHOD OF PULP DIAGNOSIS BY THE INDUCED CURRENT.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—The DENTAL COSMOS in its issue for May 1909 published an article by Mr. Coleman Tousey, entitled "The Faradic Current in Dental Diagnosis." In this article Mr. Tousey, when speaking of the faradic current (page 515), mentions my name, and in doing so has made some slight mistakes which I beg you will give me the opportunity to correct in an early issue of your highly esteemed periodical.

Mr. Tousey says:

There is little literature and less history regarding its use. In June 1902 I demonstrated the method before the Harvard Dental Alumni. In January of the following year Dr. W. J. C. Fuyt of Amsterdam published independently in the *Nederlandsch Tijdschrift voor Geneeskunde* an article concerning the same matter.

Now, this is not exactly correct, as I published this method not in January 1903, but in 1902. I demonstrated it for the first time in September 1901, in

an assembly of "John Tomes," before the students of the Dental Institute of the University of Utrecht, where I have been assistant for the last twelve years; nor do I reside in Amsterdam.

I published the method in question in the *Nederlandsch Tijdschrift voor Geneeskunde* for January 18, 1902. In January 1903, Dr. Grevers of Amsterdam, at a dental meeting in New York which was reported in the DENTAL COSMOS, gave an address on the subject of "Pulp Vitality Tested by Electricity," following the directions I gave in the *Nederlandsch Tijdschrift voor Geneeskunde*. I may here say that I have never been associated with Dr. Grevers.

My own relation to the matter was editorially stated in the DENTAL COSMOS for March 1903, page 235.

You will recognize that the foregoing are some little mistakes which it would be annoying for me not to have corrected.

Very truly yours,

W. J. C. FUYT.

UTRECHT, June 15, 1909.

NEED OF FREE DENTAL SERVICE FOR SCHOOL CHILDREN AND THE POOR IN THE CITY OF MEXICO.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—I feel it my obligation toward my profession and my honor personally to protest against the letter of Dr. Francisco de P. Bernaldez, director of the National Dental Clinic of Mexico, appearing in the issue of the *Cosmos* for February 1909, in which he refers to my article, "Free Dental Service in the Public Schools of Mexico," published in the *Cosmos* for June 1908.

In the first place, Dr. Bernaldez delayed his reply to my article for fully eight months, although only a few weeks or months would have been required, and he chides me for having given to the professional world erroneous statements concerning the care of the teeth of the children in this city, further asserting that my communication was based upon but little knowledge or reflection.

After the publication of his communication I wrote Dr. Bernaldez advising him that all the statements in my article referred to were the plain truth, based upon my examinations and my report to the director of the Normal Schools of Mexico, challenging him to show me where I had said that nothing had been done for the relief of these children, and courteously requesting him to retract his unjust attack. I further called his attention to the report of a medical inspector of the schools of Mexico, which indorsed my statements and which proved that in my article I stated neither more nor less than that physician reported to the school authorities a year ago.

What I wanted was to recommend to the municipality or to wealthy persons the establishment in this city of a dental clinic for poor children, which would be of great help to them, and which as yet does not exist. It is true beyond a shadow of doubt that the school service here in the city of Mexico is far better than in

almost any other country, and that the government does everything in its power to secure good medical attendance for the children; also that a dental college exists here where many of these children are attended to. But Dr. Bernaldez will undoubtedly admit that one dental college is not able to examine 60,000 school children, and 10,000 or 20,000 additional poor people, of which total surely 40,000 or 50,000 need dental care, and that a clinic conducted in the manner recommended in my article would constitute a great help and improvement in this city.

In New York, I believe, many dental colleges exist, yet I have noted in Dr. Zentler's paper read before the March 1908 meeting of the First District Dental Society of New York and printed in the *Cosmos* for February 1909, that the writer is trying to enlist the assistance of his *confrères* in the establishment of a dental clinic for poor children.

The work which I have done here, as referred to in my paper, is undoubtedly of great value, and yet it seems to me that Dr. Bernaldez does not understand the importance of it—for which he is less to be blamed as he is an M.D. and not a D.D.S. After having made a specialty of attending children for many years and having conducted examinations in the schools for eight months, I have said nothing more than what I have found to be true during that period.

As your journal is devoted exclusively to scientific matters and to the interests of the profession, I consider it unnecessary to further enter into any discussion of any communication by Dr. Bernaldez antagonizing my statements as published in the *Cosmos*.

Respectfully yours,

JOHAN R. DE LA PARA, D.D.S.

MEXICO, NUEVO MEXICO 11, June 26, 1909.

PROCEEDINGS OF SOCIETIES.

NATIONAL DENTAL ASSOCIATION.

Thirteenth Annual Meeting, Birmingham, Ala., March 30 to April 2,
1909.

GENERAL SESSIONS.

THURSDAY—*Fourth Session.*

(Continued.)

The next order of business was a paper by Dr. L. G. NOEL, Nashville, Tenn., entitled "The Management of the Teeth and Mouth from the Age of Six to Adolescence."

[This paper is printed in full at page 950 of the present issue of the COSMOS.]

Discussion.

Dr. T. P. HINMAN, Atlanta, Ga. I read with a great deal of interest this paper, and believe it to be one of the most valuable that has been offered to the association at this time. I agree with a great many of Dr. Noel's remarks, but in some respects I must say that I take the opposite view.

The necessity for the care of the teeth, especially of the first permanent molars, is an opinion with which I thoroughly agree. This is an old question that has been long under consideration; quiz-masters used to ask, What is the best time to extract these molars? The answer today is, Never. It is of the utmost importance in every way, from the standpoint of orthodontia, mastication, and sanitation, that the first molars should be preserved. In reference to how this should be done, someone said the other evening that the child should be under the care of the dentist from the sixth to the sixteenth year. My practice is, when

possible, just as soon as the deciduous teeth begin to appear in the mouth to request that the child be brought to the office. I think the deciduous teeth should receive as much attention or more than the permanent ones, because during the time of their usefulness the formative period of the child is taking place, and unless the child has the proper organs of mastication we cannot expect health. But the question is, how to do this. The method I have used, and one which I understand is in vogue in the practice of other men, is to have what we term a call-list, which is simply a book in which are kept the names of all patients and children in alphabetical order. For instance, if a certain child is to be called in the month of May, and if that child's name begins with "H" it is put under "H," and the word "May" is put after it. At the proper time the assistant writes a card to the parent, calling attention to the fact that the child is due at the office at a certain time, and the day and hour is designated. In this way the patients are seen in some instances once in two months; all of them are seen four times a year, and in that way I have been able to bring children from about the second year up to the twelfth or fourteenth or sixteenth years with scarcely a cavity occurring in the mouth. If care is taken of them during this period, and oral hygiene insisted on, it is really astonishing how much can be obtained by this method. You cannot

depend on the mother or the parents of the child to bring them to the office. It does not make any difference how strongly you impress this on their minds, they will simply forget it, but if you send them a positive engagement for a certain hour, you find that you will be able to give more care and attention to the deciduous and permanent teeth during this period than by any other method.

Something was said last night with reference to educating the public in reference to oral hygiene. To my mind there is only one way to do that. It is very beautiful to have this brought before us in the way it was, but to my mind the only practical way to do this is for the individual dentist to teach the individual patient oral hygiene; then it will be disseminated. Therefore, in the care of children's mouths and in the care of the teeth, I instruct the parents how to take care of the teeth, and if they realize the necessity of this as fully as they should, good results can be obtained in all instances.

The essayist had something to say on the subject of the silicate cements. Many hailed this as the panacea for all dental ills, and I began using it and thought from the results obtained at first that we had at our command a material that would take its place in our professional work, but unfortunately for me—possibly it may have been on account of my unsuccessful use of the cement—the percentage of failures in the use of silicate cement was so great as to make me absolutely abandon it. That is my individual experience, and the observations I have made in the mouths of patients coming from other cities, seeing the work of other operators who use silicate cements, absolutely confirm what I have just stated. One of the first things I noticed in regard to the silicate cements is the fact that they will discolor in proportion to the amount of pigment that is in the cement. In other words, a perfectly white silicate cement does not discolor in the potassium sulfate solution, but just in proportion to the amount of pigment that enters into it does the silicate cement discolor in

the potassium sulfate solution. Again, the question of the danger to the pulp arises: If the cavity is large and the silicate cement is brought into close proximity to the pulp, it will certainly devitalize the latter.

I do not believe in the use of cement *per se* as a filling material in approximal cavities in incisors. I may say that I have practically abandoned the use of cements alone as a preservative agent. I prefer inlays in most cases. I may be a crank on inlay work, but I prefer inlays. I have been asked how I treat approximal cavities in incisors at the age of ten years, and I simply say that I want to produce a permanent operation there, and that it has therefore been my practice for the last five years to make permanent porcelain inlays in these teeth, and the results I have obtained seem to justify this procedure.

The use of a cavity lining, especially under silicate cements and amalgams, I believe to be an admirable thing, but instead of using cements in small cavities in the coronal surfaces of molars it seems better practice and insures a more permanent operation to use amalgam. Gutta-percha also can be used in some instances, although I use it very little. In the lingual pits of incisors, gutta-percha is sometimes indicated in early life because of the fact that it is so easy to expose the pulps in these cavities. In some of these cavities, if we are not careful, we penetrate into the pulp before we know it. The filling of fissures in the coronal surfaces of the bicuspid I believe is best accomplished by the use of non-cohesive gold for a permanent operation. The operation is not so severe as to produce shock in the pulp. If there is a deep cavity the bottom should be lined with cement, and over this the gold should be used, in this way preventing reaction from thermal changes. This seems the best practice along this line.

I believe that frequent polishing of the teeth is necessary for their care from the sixth to the sixteenth year or to adolescence, also a careful regimen for their cleansing during this period. One thing for which I have to thank my

friend Dr. Kells, has been of great benefit to me in caring for these teeth during this time, and that is the use of plain simple lime-water. By the thorough cleansing and polishing of the teeth when you see indications between the incisors of discoloration that will eventually become decay because of one of those little gelatinous plaques that Dr. Miller speaks of, by the careful separating of the teeth and thoroughly polishing with strips of linen covered with pumice, you can practically polish out a great many cavities; then use lime-water at least three times a day. You will find in many cases where you use the lime-water that you will obtain better results. I believe that in many cases where we see white decay the frequent use of lime-water will arrest this decay.

A MEMBER. How do you use it?

Dr. HINMAN. Brush the teeth and rinse the mouth with it.

A MEMBER. Swallowing a certain amount too?

Dr. HINMAN. A certain amount is absorbed, but I believe that from direct contact of the lime-water in the mouth the enamel absorbs a certain amount, and in proof of that I wish to tell you this incident, which goes to prove to a certain extent that the enamel absorbs lime-water. Dr. Head put two incisor teeth in orange juice and kept these in the incubator for forty-eight hours, after which time he found that the enamel had to a certain extent softened; but when the teeth were taken out of the orange juice and put into normal saliva which contained a certain amount of calcium salts, the enamel re-hardened. I do not say that this is true, but why not?

In the treatment of approximal cavities in bicuspid and molars, I do not believe in gutta-percha or cement at the cervical border, but prefer the practice of partially filling the cavity with cement and then restoring the proper contour with amalgam, thoroughly polishing, and in this way obtaining a perfect preservation of the tooth by the cement covered with amalgam.

Dr. G. S. TIGNOR, Atlanta, Ga. In

commending this paper to the members of the association I shall not take issue with anything that has been outlined in the methods of practice, nor shall I take issue with anything that has been said in the discussion, but I wish to state that the methods as outlined in this paper are excellent, and that some of the methods Dr. Hinman spoke of in his discussion are no less so.

Dr. Osler was asked on one occasion what to his mind produced more permanent damage to the constitution, the use of alcohol in maturity or the neglect of teeth in childhood, and he answered unhesitatingly. "Aching teeth in childhood." That must be true, because there is nothing of consequence that can be accomplished by anyone who is suffering with toothache. It is impossible for the constitution to develop as it should in childhood when the patient is subject to toothache night after night, and if we secure the adoption of methods such as Dr. Hinman has outlined, of having youthful patients see us early and often, and systematically, we can prevent this trouble. I have never had toothache in my life, owing to the fact that I was born in a family of dentists, and my relatives who have practiced for us have always seen us early and often in order to prevent any trouble that might have arisen.

I have a few patients that have been in the hands of some Boston and Canada dentists all their lifetime, and these children have never experienced such a thing as toothache. It is simply a delight to practice for those people who have enjoyed this care from our profession.

I wish to bring out the fact that if we are to make progress in the practice of dentistry, here is the field in which we can accomplish it. For fifty years we have made improvements in the replacement of lost dentures, filling teeth, and restoration by crowns and bridges; but we can prevent the greater portion of this trouble. The greatest difficulty is to induce the children to come to you. This can be accomplished by the adoption of a systematic method such as Dr. Hinman speaks of, and should we fail in this, we

then can do no more than display our skill in artistic replacement by artificial dentures.

Dr. NOEL (closing the discussion). I have only a few words to say in closing the discussion, and these few words should have been written as a preface to the paper. I apprehended that you would probably misunderstand my object in treating the subject in the manner adopted. My whole object was to emphasize the importance of caries of the teeth, and our ability to prevent it, for I believe that there is no disease that is so preventable as caries. My entire object was to emphasize the importance of seizing every opportunity for minimizing the cutting and destruction of tooth-structure. Some years ago, Dr. Flagg, endeavoring to impress this idea upon the profession, referred to the fact that wherever cement fillings are used in a cavity, there is only the waste of the filling material itself, and that we should realize that tooth-structure is valuable and precious, but that filling material is abundant and cheap. This is the idea that I wished to present to you: By treatment with cements, as I have practiced it for a number of years and as I have set forth in the paper, you save tooth-structure. By treating cavities in the manner described and temporarily bringing about tubular calcification, and especially during the childhood period, when it is difficult to do even that much, you can accomplish something for the patient without entirely demoralizing him, probably to such an extent that you could do nothing else for him. Minimize the operation of extension for prevention

at that age with a view to putting in large gold fillings later on! In that way I believe we can accomplish something, instead of inserting inlays, when we must necessarily sacrifice large amounts of tooth-structure, which I certainly should never advocate in the treatment of young patients.

I wish to thank you for the kindly manner in which my paper was received and for the attention given to it.

The next order of business was the installation of officers, and the newly elected president, Dr. B. L. Thorpe, was presented to the association.

Dr. J. Y. CRAWFORD moved that the thanks of the association be extended to the retiring president and the other officers of the association for their efforts in making the meeting a success.

Motion carried.

Dr. BURKHART moved that a vote of thanks be extended to the Local Committee of Arrangements for their untiring efforts on behalf of the association.

Motion carried.

The general session then adjourned until 8 o'clock P.M.

THURSDAY EVENING—*Fifth Session.*

The fifth general session was called to order Thursday evening, April 1st, at 8 o'clock, by the president, Dr. Turner.

The Executive Council presented its report, which on motion was adopted.

The general session was then declared adjourned until the next annual meeting at Denver, Colo., 1910.

SECTION I: Prosthetic Dentistry, Crown and Bridge Work, Orthodontia, Metallurgy, Chemistry, and Allied Subjects.

Chairman—H. E. KELSEY, Baltimore, Md.

Secretary—J. S. SPURGEON, Hillsboro, N. C.

SECOND DAY—Wednesday.

IN the absence of the chairman, the first meeting of Section I was called to order by Dr. H. H. Johnson, Macon, Ga., at 10 o'clock A.M., Wednesday, March 31, 1909.

The first order of business was the reading of a paper by Dr. GEO. H. WILSON, Cleveland, Ohio, entitled, "The Principles of Retention of Artificial Dentures."

[This paper is printed in full at page 934 of the present issue of the *Cosmos*.]

Discussion.

Dr. S. L. RICH, Nashville, Tenn. I cannot but feel that a great honor has been conferred upon me in that I, one of the younger members of the profession, was called upon to open the discussion on this most excellent paper written by a man whose attainments in the field of prosthetic dentistry have placed him in the front rank of his profession. While I feel deeply the honor conferred upon me, I realize that a difficult task has been assigned to me, because Dr. Wilson's papers are so complete that they leave very little for other men to say. I heartily agree with every suggestion offered in his paper, and the best that I can do is to try to emphasize some of the points which he has made.

In the first place, we know that we cannot depend entirely upon atmospheric pressure for retaining artificial dentures. That was for a long time the current idea in the profession, but we now know that adhesion plays a most important part, especially in the retention of full upper dentures. The essayist also tells us that the force of adhesion depends directly upon the area of surface contact between the denture and the tissues of

the mouth, and for this reason we should secure as much contact as possible by extending the denture in every direction as far as is practical. In some cases where the ridge is not high we should even extend the lower denture inward along the floor of the mouth and underneath the tongue, in order to increase the surface contact and so receive more retention from adhesion. However, in extending our dentures we must not impinge upon the muscular attachments, because the force exerted by the muscles is greater than the force of adhesion, and consequently the denture would be displaced rather than held in place as a result of the extension.

I do not wish to commit myself to the statement that atmospheric pressure plays no part in the retention of artificial dentures, for I believe that in the upper jaw it plays an important part, especially until the patient has learned to use the teeth properly.

I agree with the essayist's view concerning the early insertion of artificial dentures to overcome the disadvantage of leverage; that is, however, only one of the many important advantages to be gained by the early insertion of artificial dentures.

Dr. F. W. STIFF, Richmond, Va. I have little to say on this subject, for the same reason as Dr. Rich gave. The profession is to be congratulated upon having among its members a Wilson, a man who is willing to devote his time and labor to scientific research in this unpopular but necessary domain of our profession—prosthetic dentistry. We who teach in the schools know how difficult it is to induce students to take an interest in this work, and we are continually urging them to give more time and attention to prosthetic dentistry.

When a paper is read before a society each member of the audience is weighing the arguments and the evidence adduced, and comparing them with his own preconceived notions on the subject. I must confess, as did Dr. Rich, that the views of Dr. Wilson are so nearly similar to my own that I have little to say about the paper except in commendation of it. I have long ago discarded the use of vacuum chambers in artificial dentures, believing that they are not necessary, but that the plate is retained by adhesion of contact and more largely by atmospheric pressure than I think Dr. Wilson claims. I do not think that his experiment is entirely conclusive. In regard to the test which he made of suspending in a vacuum two substances attached by adhesion, I should like to ask the question whether or not he made a comparison between the power necessary to separate these two substances in the vacuum and the power necessary to separate them in the air? If you will try that, you will find that it will take less power to separate them in the air than in the vacuum. Adhesion or contact in my opinion plays a very important, in fact the most important part, in the retention of dentures, but throughout the wearing of a denture, temporary or permanent, atmospheric pressure forms an auxiliary to the retention.

The personal equation which the essayist mentioned in the opening portion of his paper has a great deal to do with the retention of plates. I had a patient who wore a partial plate with four incisors; the plate was broken entirely across lingually of the incisors into two pieces, yet the patient for several years wore that plate in two pieces. I think that without the assistance of nature, and persistence, particularly of our lady patients, we should have a larger percentage of failures than we really have on account of faulty adaptation.

Dr. A. J. COTRELL, Knoxville, Tenn. I am very sorry that my friend called attention to me, because I believe that brevity is not only the soul of wit, but that, in the discussions at least, it contributes largely to the success of a dental meeting.

First I want to thank Dr. Wilson on behalf of myself and the profession for the careful study which he has devoted to this subject, and I say to you gentlemen who want practical subjects expressed in a practical way that Dr. Wilson has brought to you in this paper the milk of the cocoanut. It will be well worth your time to secure this paper after it has been published, and to study it carefully. I am glad to see that in these days, when mechanical dentistry has become so unpopular, a few men are still left who know how to construct artificial dentures, and who are still willing to perpetuate knowledge along these lines. The young men practicing today go wild on the subject of bridge work, porcelain, orthodontia, etc., and absolutely forget all about prosthetic dentistry, but as long as people live and as long as people lose teeth, somebody must be able to construct well-adapted dentures, and those of us who possess that faculty may consider themselves fortunate indeed.

I shall pass over the question of adhesion by contact and atmospheric pressure because they are accepted facts, and will refer just briefly to the one factor of leverage that the essayist mentions, and which the average practitioner overlooks in the construction of a denture. This is the rock upon which many pieces of bridge work and many prosthetic appliances have been wrecked. I have seen teeth that were protruding a quarter of an inch from the ridge; the farther they protrude the more adverse the influence of leverage. In proportion as the teeth are set toward the inner side of the ridge, the principle of leverage becomes an aid, because then the denture is forced deeper into place. The alveolar ridge acts as a fulcrum, and the opposing jaw is the force on the lever. If the teeth are set on the outside, a fulcrum is established which displaces the denture, while if they are inclined to the inner side as much as possible a fulcrum is established that will drive the denture into place. This is a point that we should look after very carefully, and that is very often overlooked. Of course, for cosmetic reasons there is a limit to the advantageous use of this

influence, but it should be utilized to the greatest extent possible.

Another point that the essayist has accentuated is the desirability of extending the plate over the surfaces as far as the attachment of the muscles will permit. This necessarily gives the retentive benefits afforded by the undercuts at the canine fossa and the maxillary tuberosities. These factors contribute greatly to the retention of the upper denture, and yet they are often entirely overlooked. You have all seen dentures in which the prosthetist has failed to take advantage of a well-developed maxillary tuberosity.

The character of the soft tissues was also mentioned and analyzed. There was a time when we constructed all dentures alike, but we now understand that if we would be successful we must consider the character of the soft tissues in each individual case and proceed accordingly.

Let me close as I began, by advising everyone who intends to construct artificial dentures to secure this paper and study it closely, because it will be well worth while.

Dr. J. P. GRAY, Nashville, Tenn. I wish to congratulate the association on this excellent paper, because we have so few men who understand prosthetic dentistry. I am not surprised that many people go to the shops to obtain artificial dentures, because there are so many men who do not make plates very much better than the shops do. Many practitioners go into their laboratories when they are tired, postponing that work until the very last, and often until night, and then try to make a piece of prosthetic work. I dare say that when Dr. Wilson begins a piece of this work, he does it at a set time, and when he is in the best condition for that work.

There are three principles which must be considered in the making of a set of teeth for an edentulous mouth: First, we must remember that the articulation must be proper; next, that we must restore the features to their normal conditions; and third, vocalization must be considered. To all of these points little attention is given. Some make plates

too thick and destroy vocalization in all of its forms of speech, others forget all about the muscles of the face; yet no good set of teeth can be made unless all three of these requirements are fulfilled.

The essayist entered into the question of thorough retention of the teeth. One little knack may be of help to the younger men especially; that is, in a lower plate run a string around the outer rim, commencing back at the angle of the jaw and passing around the entire edge of the plate. Invest that in the wax, and in this way you will secure a V-shaped space into which the muscles will drop, and which aids in holding the plate. In the course of a week the muscles will be lying in that space in such a way as to produce almost a complete suction. This is especially useful if the lower ridge is almost entirely gone, and if the plate is to be left as flat as possible.

As to Dr. Wilson's ideas on the articulation of the teeth, no one will of course attempt to disagree with him. I always bow to him when he speaks of prosthetic dentistry, because I regard him as one of the greatest prosthetic dentists in this country.

Dr. J. Y. CRAWFORD, Nashville, Tenn. In addition to its value this paper seems especially appropriate just now, since mechanical dentistry or the consideration of artificial dentures has never been more important in the world's history perhaps than now. It has been said that we shall always have edentulous mouths. That is true, but the important point to which I wish to call your attention, in addition to indorsing the paper, is that the proper appreciation of this subject is one of the best tests of the dental profession and its capacity for meeting the wants of the general public. If I, a humble teacher of dental surgery, were called upon to designate what clinical proposition would best test the practitioner's powers in regard to clinical diagnosis, I should probably say: Take a typical patient who has passed the meridian of life and has perhaps been unfortunate from the dental standpoint, and determine whether his natural teeth should be preserved or whether it is time to substitute an arti-

ficial denture. This to my mind is one of the strongest arguments that can be raised in support of the idea of keeping dental surgery together. Any man ought to be a better practitioner of operative dentistry if he understands mechanical dentistry, and any man ought to be able to do better mechanical dentistry if he is competent in operative dentistry. If a man devotes his life to the preservation only of the natural teeth, he will go too far in that extreme, and if he devotes his entire life to the practice of mechanical dentistry, he goes to the other extreme. One man will sacrifice teeth that he should save and the other will attempt to save teeth that he should sacrifice.

In order to derive the proper benefit to humanity from both branches of dental surgery, we ought to hold consultations more frequently than we do, when the time comes that we have to determine whether a patient should have an artificial denture, and we should call upon men like Dr. Wilson. If that idea is inculcated in the minds of the younger men, a higher professional status in dental surgery will develop. In this respect the other professions should be a lesson to us. Take the profession of law for instance. If today a great question of law arises in which human labor is involved, we immediately procure a lawyer, who will procure assistants to help him. If it be a condition of surgery in which human life is involved, not only one surgeon, but two or three will be called into consultation. But in dental surgery, where the matter of practical consultation would be of more advantage than in any other profession, how many consultations does a practitioner in this country have in a year? There surely is a decided lack of such consultations. In the practical application of mechanical dentistry to the wants of the people and in its professional aspect, there is nothing more valuable to patient and profession alike than a rational, properly conducted consultation. This would increase the reputability of dental surgery and give it more influence. People would say that if the dentist is so much interested there

must be something in it, and dental surgery will rise in public estimation.

Dr. E. M. KETTIG, Louisville, Ky. The subject of the retention of artificial dentures is one of very great interest to those of us who like prosthetic dentistry. I am sorry to say that there are few of us who really do love that branch of dentistry, probably because prosthetics is attended with so many difficulties, disappointments, and despairs that the men who take up that work become discouraged. A very large percentage of the men who start out in the field of dentistry fall in love with operative dentistry, but very few become prosthetic dentists on account of the vast number of difficulties to be overcome.

Probably one of the greatest troubles we have, and one easily overlooked in the retention of upper dentures, is the fact that we usually try to secure an impression of the mouth with the tissues in a state of repose, whereas we should bear in mind that when the plate is about to be used in mastication, when stress is about to be brought to bear upon it, a different condition arises than when the mouth is in a state of repose; therefore in taking an impression of the mouth we should try to use about as much pressure as is exerted upon the plate during eating. That is often overlooked.

Most dentists use plaster for taking impressions, yet in many mouths, in my experience, plaster is probably one of the poorest materials we have. So many conditions arise from the varying degree of hardness of the roof of the mouth, and for these we should make provision. If we can get a plate that will fit in the roof of the mouth and resist stress equal to the amount of force used in mastication, we have solved that problem to a large extent. If plaster will not solve that problem, we should use something else—modeling compound. My method is to take a modeling compound impression of the mouth, then cut out a thin layer of the compound so as to form a matrix that will fit almost perfectly the entire area of which I wish to get an impression; then I take an impression compound of a lower melting-point, and

spread a thin layer of it inside of that matrix that I have first prepared. The outer layer of compound is cool, and the inner layer must be applied somewhat hurriedly, so as to keep it warm, before the bottom layer becomes soft. Then the whole is put in place, gradually and with precision, and a great deal of pressure is used in bringing it against the roof of the mouth. In that way full advantage is gained from the compressibility of the tissues, without displacing them. A plate made from a model prepared from such an impression will be retained in the mouth during mastication. In lower dentures I believe the outer buccal portions of the lower rim of the plate should not be so prominent, but the posterior lingual portions of the plate should extend under the lower portions of the tongue, still allowing the tongue enough room to perform its function.

Dr. WILSON (closing the discussion). I wish first to thank the association for the kind consideration of this subject.

I wish to call attention to the fact that we do not always make the proper distinction between atmospheric pressure and adhesion. In order to have atmospheric pressure, we must have a vacuum cavity and the air partially exhausted from it. As soon as the cavity is filled by any means, atmospheric pressure ceases. After an artificial denture has been worn for a time, the fluids make contact with the maxillary surface, and as atmospheric pressure ceases the retentive force must be something else. As there is always moisture between the soft tissues and the plate, atmospheric pressure must cease to operate because of the law of hydrostatics.

The strong statement was made in the discussion that plaster is the worst material that can be used for taking impressions. I would say just the reverse. I consider it the best material that can be used. The difference is this: One man can probably obtain better results from one material and another from another. It is simply the man behind the material. I believe that plaster is the best when properly used, because in it the action of the soft tissues can be more readily in-

dicated. A compound impression lined with plaster is often improperly called a modeling compound impression. You would not speak of an impression as being a block tin impression simply because the block tin tray held the compound. It is the part that comes to lie next to the tissue that should give the name to the impression.

I thank you, gentlemen, for your attention to my paper.

The next order of business was a paper by Dr. H. H. JOHNSON, Macon, Ga., entitled "Observations on Crown and Bridge Work."

[This paper is printed in full at page 941 of the present issue of the Cosmos.]

Discussion.

Dr. H. T. STEWART, Memphis, Tenn. In the copy of the paper which he sent to me Dr. Johnson started out by assuming that he did not know anything about bridge work, and that he was inflicting himself on this section by offering a paper. I have always believed that a man who has a good thing should stand up for what it is worth. We all know that Dr. Johnson is an excellent dentist and a fine crown and bridge workman.

Dr. Johnson spoke of using the band under the gum. I think we all agree that if we could avoid the use of the band under the gum we would only be too glad to do so, but bridge work has not yet reached that stage where it is possible to do so. It is true that in the cases of the ordinary bands met with, the gums of the patients about the roots of the teeth would be better off without the band, but at the same time we must use it in many cases, and if it is made properly there is practically no irritation under that band. In my Riggs' disease work I have had to be especially careful on that one point, and I have long ago stopped making collars to go on the root. I first prepare the root in a conical shape, which is a great deal more easily said than done. The conical shape should be extended well under the gum, if necessary, with a bud-shaped bur. The floor

and collar are both swaged in one piece out of pure gold, as thin as will bear the blowpipe. I generally use about No. 35 or 36 gage, taking the impression first with modeling compound, after having made a band that fairly accurately fits the root. This band can be made of any sort of material that you please, preferably copper or German silver, and after filling it with compound it is put on the end of your finger and pressed to place. After obtaining your impression, make a cement die and swage the floor and collar all at once. It makes no difference how careful you are in this, you cannot get an absolutely accurate fit. The most particular part of the work is the burnishing of the pure gold floor and collar to the surface of the root and under the gum. That should be done with exceeding care; the ordinary burnishers are not suited for that purpose. I use burnishers after the style of Dr. Reeves', designed for burnishing platinum into cavities for porcelain inlays. The gold must be burnished to the surface of the root as closely as in burnishing a piece of gold or platinum for an inlay. If the burnishing is done thoroughly the accuracy of the fit is certain. Another important step is the shaping of the root into a cone. We wish to restore the root to its original shape. The floor and collar are then laid on a second piece of gold and soldered to that piece, which is cut out a little larger than the other, invested, and flowed full of solder clear up to the edge of the band, thus restoring the original shape of the root, and bringing it clear out flush with the root where it has been cut off with the bur. In that way I find that the irritation is reduced to a minimum, and if the operation is carefully done, there is little or no irritation to the gum.

I heartily agree with Dr. Johnson in his statement that wholesale destroying of pulps should not be resorted to in crowning teeth. We have a great deal to learn in this respect, and Dr. Johnson's ideas, together with those of Dr. Alexander on preserving the pulps in such cases, are very acceptable. We have a great field before us in that line. While

it is necessary in many cases to destroy a pulp, yet we should preserve it whenever we can, for many different reasons, not the least of which is that we cannot always thoroughly clean the root-canals, especially those in molars, up to the apex and then thoroughly fill them, in spite of the best of intentions. If we could take out teeth, especially molars, that we have filled to the best of our ability, some two or three years afterward, and could examine them thoroughly, we should be astonished at the imperfect conditions which the roots of these teeth would present.

The average lifetime, especially of molars that have been treated and the roots of which have been filled by the average practitioner, is far shorter than we are willing to admit. If in abutments for a bridge the pulps can be saved, it is usually far better to do so, unless these teeth are badly affected with Riggs' disease; in the latter case I do not hesitate under any circumstances to devitalize the pulp; it should be done in nine out of ten cases. In the first place, I think the teeth are better off. I have for years argued that when teeth that are badly affected with Riggs' disease are cut off, it is somewhat like cutting off the branches of a tree; the vitality is confined to the remaining portion of the teeth, and in that manner we obtain the best results. Moreover, if teeth, especially molars, are cut off, we can operate better around the teeth and can obtain much better results than if we try to operate on a tooth with a vital pulp.

Speaking of these bands reminds me of a paper on partial plates that was read by Dr. House before the Indiana Society, in the discussion of which Dr. J. D. Patterson of Kansas City made the statement that in his experience "the best partial plate was worse than the poorest bridge." He also stated that bands should never be used on the teeth, and that no tooth should ever be crowned without having first been devitalized. Such views are not only extreme but foolish. I can conceive of nothing worse than a poor bridge. As Dr. Johnson said, we often see ill-fitting bands and shell

crowns extending beneath the gum with great shoulders under which large quantities of cement are held; I can conceive of nothing worse than that. Dr. Patterson also said that the band should never be used, and gave as one reason for his assertion that we could not secure the proper interdental space. I wish to emphasize, however, that you *can* secure the proper interdental space by constructing the bands in the way described; oftentimes we can obtain a much wider interdental space than exists naturally, especially if two adjoining teeth are to be crowned. The interdental space in such cases can be made so that the body of a small toothpick can be passed between the two teeth. So this is not a good argument against the band. While the band, as Dr. Johnson says, is wrong in principle, we have to do the best we can, as so far there is nothing that could entirely take its place.

Dr. T. P. HINMAN, Atlanta, Ga. In discussing this paper I wish to remark first, that the paper that has been presented to the association seems somewhat different from the one that has been sent to me for discussion; therefore some of my remarks will probably involve points that were not revealed in the reading of the paper.

In the main I thoroughly agree with Dr. Johnson in what he says with reference to bridge-work attachments, etc. There is one feature that he spoke of in reference to the failure of bridge work that seemed to impress itself more on my mind than anything else, and as he does not bring this point out clearly, I think it would not be out of the way to mention it at this time. The failure of the majority of bridges, the loosening of the abutments of which he speaks, is in my opinion not so much due to the fitting of the bands below the gums as to bad occlusion. If you have a molar attachment which is, say, one one-hundredth of an inch too high, the entire pressure of the jaw during the process of mastication is brought to bear upon this attachment, and in the molar region this pressure approaches one hundred and twenty-five pounds. You can therefore

readily see how this continual impact will cause the loosening of the attachment, a diseased condition of the gum, and the failure of the bridge. Uneven distribution of the stress of mastication, in other words allowing the greatest amount of pressure to occur at one point, will certainly create inflammation and cause failure of the bridge.

I am thoroughly in accord with the essayist in the belief that it is not wise in a majority of instances to destroy the pulp for the purpose of making an all-gold crown, although there are certain teeth of a bell shape where it is necessary to destroy the pulps if an accurate fit of the gold crown at the gum margin is to be secured. The pressing of the gold band far beneath the gum certainly is, as we all know, bad practice, causing recession of the gum and subsequent decay. It is often the case, however, if a tooth is vital and recession and decay take place, that the tooth readily responds to sensations of heat and cold, warning the operator of the approach of destruction.

As for the half-banded crown, the so-called modified Richmond crown, I do not believe in that form of appliance. If for the purpose of strength we have to band a root, I believe the continuous band to be the better. As for hoods, inlays, etc., for bridge attachments, I have used these for quite a while. In the making of the hood, which I believe I designed, and in the making of inlays for the purpose of bridge attachments, instead of making a staple on the crown as the essayist suggests, my method is to put in two pins at the gingival border, which I believe makes a simpler and just as strong an attachment. In my observation the majority of operators make a mistake in attempting to cast the abutments out of 22-karat gold. Indeed, to attempt to cast inlays for attachments out of a low-karat gold means practically certain failure. The cast is not clear and clean on account of the oxidation, and consequently the attachment is not as strong as desired. A small proportion of platinum added to the pure gold will produce a much stronger attachment

that will not oxidize, and will afford a more perfect fit.

In reference to cements, we very often hear the question as to what is the best cement for cementing crowns. There are so many good cements on the market that it is difficult to indicate which is the best, although I have my preference. Failure in their use is due to the fact that the operator is not familiar with the material which he is using; one cement in one operator's hands will give good results, whereas in another's hands it will not give good results, owing to the operator's unfamiliarity with that particular cement. Therefore, in a great many cases, especially of students who

ask which is the best cement to use, my answer has been that they should select some good cement, become thoroughly acquainted with its peculiarities and learn how to work it properly, and then they will not be troubled with the cement washing out from under crowns.

Dr. JOHNSON (closing the discussion). As the paper is of no special importance, I do not care to add anything to it, and as the hour has arrived for the convening of the general session, we will simply consider the subject as closed.

Section I then adjourned until a later session.

(To be continued.)

CONNECTICUT STATE DENTAL ASSOCIATION.

Forty-fifth Annual Convention, Waterbury, Conn., April 20 and 21, 1909.

THE forty-fifth annual convention of the Connecticut State Dental Association was held in Leavenworth Hall, Waterbury, Conn., on Tuesday and Wednesday, April 20 and 21, 1909.

TUESDAY—*Morning Session.*

The first meeting was called to order on Tuesday morning at 11 o'clock by the president, Dr. W. O. Beecher of Waterbury, Conn.

After the transaction of some routine business,

Dr. F. T. Murlless, Jr., occupied the chair while the president, Dr. W. O. BEECHER, Waterbury, read his annual address, as follows:

PRESIDENT'S ADDRESS.

I esteem it a high honor and privilege to have been chosen to preside over the deliberations of this the forty-fifth annual convention of the Connecticut State Dental Association, and I consider it an

even greater honor to welcome you, members and guests of this association, to the first convention ever held in this city of Waterbury—the Brass City of our commonwealth. It is not my intention to give you a lengthy discourse on the scientific principles of dentistry, for such matters will be well taken care of by the able men whom we are fortunate enough to have with us at this time.

Before offering you a few suggestions that have occurred to me during the year I have held the office of president, I wish to thank my fellow officers and members of the Board of Censors, also the members of the different committees who have so ably and tirelessly supported me by their efforts. Whatever success may be attained at this meeting is wholly due to them, and the credit is theirs alone.

There are several subjects of deep interest which should concern every member of this association. First among these I consider to be the examination of the teeth of children in the public and parochial schools. This to me is a mat-

ter of vital importance, not alone for the dentist, but for the welfare of the community at large from the standpoint of health and hygiene, as every one of us can see in our daily practice evidence of the lamentable condition among children whose mouths we have to examine, this being particularly true of the children of the poorer classes. Such a condition lessens their mental and physical capacity, making them less capable and able of application and comprehension, poorer students, and therefore less desirable prospective citizens of their respective communities, to say nothing about the danger of infection and contagion of other children who are compelled to come in contact with them.

Too much pressure cannot be brought to bear upon the city, town, and state officials who have our schools in charge that they may see this matter in the same light as the medical and dental professions view it, and some concerted move should be made by our state and local societies to bring about some action whereby the children in the schools, both public and parochial, should receive better dental instruction and an oral examination, that their parents may become enlightened and thus know the true condition that exists in the mouths of their children, particularly those between the ages of six and twelve years. This responsibility lies with us as a profession—a responsibility which we should not shirk, not only as a profession, but as good citizens of the community in which we live.

There seems to be a lamentable weakness in the presently existing dental laws, which weakness is being taken advantage of by a certain few who, by the advice of counsel, are able to practice dentistry illegally, and baffle the efforts of county health officers to successfully prosecute them. Our law should be strengthened and improved, and the technical parts more definitely defined, so that there can be no loophole in the way of technicalities that would make evasion of the law possible. This matter is now in the hands of the Legislative Committee and of the Dental Commissioners, who are

giving the matter their best consideration, endeavoring to frame a law that will meet the exigencies of the case. You should, for your own protection, take a deeper interest in matters of this nature, be more frequent in attendance at the meetings of the Committee of Public Health and Safety—concern yourselves with all subjects pertaining to dental legislation, not only for your own protection, but for the protection and dignity of the profession in general and the protection of the public, that they may not fall into the hands of illegal and unscrupulous practitioners.

Regarding the matter of the appointment of dental commissioners, I believe this should rest in the hands of the state association, thus not making the appointment one of political barter, as it sometimes now seems to be, for all matters of education should be beyond the reach of political influence. This would assure the appointment of the best representative men of the profession on our state commission, and put our commission on a level with those of other states, and also render it equal to that of the medical profession. Until this end, however, can be achieved, we must make the best of the conditions as they are at the present time, and by what political influence we possess bring about the best appointments possible, thus adapting ourselves to the situation—for success is only attained by adapting ourselves to the conditions in which we are compelled to labor.

I would also advocate more frequent meetings, say one evening meeting each in October and January, and the reading of a paper by some able man on some interesting subject would be a benefit to us all. These meetings could be held in different parts of the state within easy access, thus assuring us of a good attendance, bringing us into closer touch with each other, promoting good-fellowship, and tending to make our association one harmonious working body. The benefits we would derive, namely, an increased membership and a more active interest on the part of our present members, would more than offset the expense these meet-

ings would entail. The idea of more frequent meetings occurred to me too late, else I should have endeavored to put it into effect during my term of office. I would also recommend a closer affiliation of our state dental organization with the National Association, and advise all who feel inclined, to join the National Association; I would also advocate a closer bond of union between the state and local societies, advising that the state organization as a parent organization foster and keep a watchful eye over the local societies, and aid and assist them in every possible way, and in turn, I think, the local societies should reciprocate in assisting the state organization, thus connecting the chain. This would bring about a closer bond of union in the profession at large.

Our finances are, at present, in a somewhat better condition than they were two or three years ago, thanks to the carefulness and the watchful eye of my predecessor, Dr. Hindsley of Bridgeport, but there is still room for improvement. Our membership is increasing, but not as rapidly as could be desired, and a more active canvass should be made, that all ethical and desirable men may become members and thus strengthen our membership and improve our financial condition.

The present convention is to be conducted along somewhat different lines than have heretofore been adhered to, in that exhibits have been by invitation confined to dental houses and exhibits of dental specialties alone, placing the exhibit under the control of the state association and eliminating, as far as possible, the mercenary spirit that has heretofore been shown, thus putting us on our own basis and giving us a more ethical standing. No advertising has been allowed in the program, thus eliminating another undesirable feature. We have endeavored to secure a larger number of clinicians, devoting two afternoons to clinics, instead of one as before, and I am happy to say that a large number of these are given by members of our own organization, which I think shows

a more active interest on the part of the members.

These innovations are somewhat of an experimental nature, but I hope they will meet with your approval, and thus merit their continuance in the future.

I sincerely hope you will receive much enjoyment and instruction from the different sessions of this meeting, and the benefits you may derive from them may be carried out in your daily work with good results to the public which you serve, increasing your ability in your profession and making better dentists, and thereby better citizens.

Discussion.

Dr. O. T. RULE, Meriden. The examination of children's teeth is of the greatest importance for several reasons.

If only one thing were accomplished, viz, the enlightening of the parents' minds regarding the fact that the first permanent molar is not a deciduous tooth, a very great deal of good would be done. But when we consider that badly decayed teeth may have a direct bearing on the health of the little patients, and may be the breeding-place of germs that may spread contagion to other children, then the subject assumes still greater importance.

Any plan, therefore, to bring this prominently before the public whom we individually serve, would surely be welcomed by each one of us.

Dr. I. B. STILSON, Stamford. I should like to commend the holding of more frequent meetings as advocated by the president. If we could come together two or three times a year, have a few papers read, and discuss interesting matters, it would in my belief help our society. I for one should be glad to attend such meetings, and if a meeting-place at a central point in the state could be selected, many of the members would be willing to attend two or three times a year.

Dr. C. W. STRANG, Bridgeport. Probably all recognize the very great importance of the care that should be given to

children's teeth, but we also know that it is only a small per cent. of the children even of cultured, educated New England, that are receiving proper service in the care of their teeth. The larger portion of the children are uncared for, and their teeth are going to wreck and ruin. "A stitch in time saves nine"—we all realize the truth of the proverb in our practice, and as a result the dental practitioner of the present time tries to see his patients two, three, four, five, and in some cases six times a year, and some are going so far as to see their patients even oftener than that for oral prophylaxis work. One of the greatest misfortunes that can come to an individual is the loss of the natural teeth, and what is lost in childhood cannot be regained at a later period. If the examination of children's teeth is to be attended to properly, it must be largely done by the young men of the profession. They have the time, the vitality, and the physical force to attend to this work. The middle-aged practitioner and those advanced in years have not the amount of vitality to spend outside of the requirements of their own office and practice, although it may be their hearts' desire to expend their efforts in that direction. The question then is: Are you liberal enough to take up this work and carry it on? Our work is very different from the physician's. As I look at it, the medical practitioner can afford to do more or less charity work. He goes to the hospital and spends half an hour or an hour, and then visits his patients, and it does not require very much time for him to distribute the needed advice. With the dentist, however, very little can be accomplished in an hour; even if he gives an hour a day to poor patients, he can accomplish but very little in that time. If we are to do charity work, we must devote to it two or three hours a day, and that means a tax on the vitality that the average dental practitioner is not able to stand. Therefore it seems to me, as the matter has been presented by our worthy president, that it is for the younger men to interest themselves in this work and to carry it along with the

good wishes, the sympathy, and support of the older ones. Will you do it? It is work for which you will be compensated; it is work that will bring to you compensation that is to be valued not by dollars and cents, but by the appreciation on the part of those who receive your service—and that counts for more than dollars and cents. You may not receive that appreciation at the present, but I believe that in the future there will rise up those who will say that at some time in their childhood days, when they did not have the means to pay for dental services, Dr. So-and-so was kind enough to take their case in hand and give them the services and attention and advice that in later life proved to be of inestimable value to them.

Gentlemen, this is a matter to be seriously considered. Means must be adopted and methods planned, the outcome of which shall be the betterment of the comfort of the rising young generation.

Dr. JAMES McMANUS, Hartford, Conn. My ideas regarding charity work differ from those of a great many members of the profession. These members are very earnest and honest in the expression of their opinions, and I have the same right to feel that I am earnest and honest in the expression of my own, even though I sometimes think differently from my good friends on the subject.

Dr. Strang spoke very fittingly on this question of charity work—medical charity and dental charity. The state, the cities, and charitable people have contributed largely; they have established and endowed hospitals, and in my home city every year or two an extra contribution is granted and donations are constantly made to pay the expenses of our hospitals, which have the attendance of our best physicians and surgeons. These physicians and surgeons go to these hospitals, look at a patient, feel his pulse, take his temperature, and refer to the written report of the nurse. They rarely come in close contact with these patients. They can go into the hospital dressed in style, and leave without having come in contact with anything that would soil

their clothing or even their hands. They make their calls during the day on poor patients, and it is an easy matter for them, as they drive around in their autos and carriages, to stop at a house, see a patient for a minute or so, and write a prescription for him. In his hospital and private practice among poor patients the physician often gets good return for his charity work in experience and in the studying of the varying conditions and phases of different diseases as manifested in the homes of the wealthy and the very poor.

Now, take dental charity work. There is nothing given by the public, the state, or the cities to put into commission any room in any city of the state, but one, where a person can receive dental service, consequently whatever charity work the dentist does must necessarily be done in his own office, and the majority of dentists who try to have a well-fitted office and clean surroundings are rather loath to receive very poor patients, even if a poor person should dare to go there asking for charity service. Even a first-class workman whose work is of a kind that soils his everyday apparel will suffer a good deal of pain before he will enter a well-equipped dental office and ask the dentist to do work for him, even though he be willing to pay for such service. Everything in the modern dental office is of the kind that attracts wealthy people, and as a rule, poor people do not think of going there, but if they do, they see the condition the dentist is in. If the patients are very poor and not cleanly, the dentist hesitates naturally to put his arm around them, for he does not know what condition the head or the clothing is in. He hesitates about doing a certain class of work, and it is certain that if a well-to-do patient comes in and sees a filthy person in the chair, he rather hesitates to sit in the chair after such a patient. Charity work, in my opinion, can only be done by the dentist, if a number of citizens and such authorities as may contribute become interested enough to furnish a suitable place with proper appliances where the poor may go; then let a dentist be em-

ployed by the city or town at a reasonable salary to stay in that office as he would in his private office, and take care of the charity patients and the school children who may need urgent emergency service.

It is all very well to talk about examination of children in schools, and I believe in examinations, if they are properly carried out, but as Dr. White stated in Boston last fall, the medical examinations in public schools are a farce. Examinations, if they are to be thoroughly conducted, will take some time. You cannot go into a schoolroom and examine fifty scholars without giving considerable time to it. School examinations are valuable in a certain way, if they are properly organized and if the means are appropriated to pay men for giving their time and attention to that work.

My idea with regard to children has been that the place to talk with children on this subject is the kindergarten, or the rooms where the youngest children are. The teachers can inaugurate a great work and carry it on and make it effective at that age better than at any other, better even than the children's parents could do by their efforts. The teacher that spends a few minutes' time two or three times a week with these little children, teaching them not only to come to school with clean hands and faces, but also with clean mouths, would do more toward obtaining good results in this direction than anybody else. If the children have not tried to have their mouths clean when they come to school have the teacher take them to one side and talk to them; this could be done before the school to produce a little spirit of emulation, and in that way, after a time, the children would gradually realize the importance of dental care. For the very poor children, have a place where they can receive emergency treatment, and little by little teach these children to keep their hands clean and their teeth as well; by gradually working along in such a way, they will in time be willing and able to pay to the dentist a reasonable fee for his service. In order to

accomplish this the younger dentists should take an interest in public affairs and clean politics tending toward the betterment of the public. If dentists in every town would work together, they could easily have a dentist on the school board and one on the board of health, and, little by little, influence could be exerted, and the attention of the public and of the civic authorities could be guided in such a way that they would make proper provision for dental charity work.

Regarding frequent meetings of the State Society, let me remind you that in the early days of this society we had semi-annual meetings. The regular annual meeting was held in Hartford, and the semi-annual meetings were held in different parts of the state. That worked well for a while, but later on it was given up. There is less necessity now for having meetings more frequently than there was at that time, because of the fact that we have many splendid, healthy local societies in Hartford, New Haven, Waterbury, New London, and Bridgeport. If we can keep up the interest in these local societies, get greater attendance, solicit more earnest work on the part of the members of these local societies, hold local meetings with dinners and sociable functions at regular intervals, and then at the end of the year come before the State Society with the best work done by the different local societies, we can accomplish more, I think, than by holding more frequent meetings of the State Society. In this way we can induce the younger men to take more interest in the local societies and also in the State Society, and everything will go along most satisfactorily in the future.

Dr. A. D. BLACK, Chicago, Ill. I should like to speak briefly on two phases of the President's address. First, the benefits that an association like this may give to our school children. In the West we have taken much interest in the work that has been done and is being done in this respect in New England, and particularly in Massachusetts. It is a subject which, as we all know, has been more or less talked about in our state

and in local societies for a good many years, and yet we might say that almost no actual results have been accomplished, further than possibly some spreading of education among our people.

I wish to mention the work that has been in progress for several years in one local society in Illinois, at Rockford. A room has been maintained in the Rockford hospital for free dental work, and the various dentists of Rockford have each given one day's time each month to operating in that room. All the work is done there free of charge. All the local dentists of the city, about twenty, take part, and they are doing a splendid work in giving free dental service to the poor of that city. I do not believe, however, that we should consider this subject—speaking of school examinations—too much from the standpoint of charity, because a very large percentage of the students in our schools need dental service, yet do not realize it, although their parents can afford to pay for it. There are two classes to be considered in the matter of public school examination work, those who are not receiving dental service, whether able to pay or not, and those who are under the care of dentists; these two should not be confused. It has been suggested in discussions of this subject in our state that the board of examiners be permitted to examine only the teeth of those pupils who are not regularly under a dentist's care. This could be accomplished by allowing those pupils who are receiving dental service to present certificates from their dentists stating that their teeth had been examined. That is all the board of examination would require, and no regular examiner would have the right to examine such children. This would eliminate one objectionable feature of the examination, and confine it to those who really need it. One of the greatest difficulties in all matters of this kind has been the personal aspirations of some men in the profession and the jealousies of others. There have been many men who have gone into this work with no idea of getting anything out of it, and they have encountered the jealousy of others in the

profession, and on the other hand, many have gone into this work with motives that were not the best.

We are working in Illinois on what may be called the other end of this proposition, and our plan, which is only partially matured at this time, is to arrange for a series of lectures on oral hygiene in the various state normal institutions, a regular course of lectures that all teachers must take. If we succeed in that, we propose to follow it up with lectures in the county normal schools, and teach the teachers something of oral hygiene and such items as they should impart to their pupils regarding the care of their teeth. The greatest difficulty in this plan is to get enough good and capable men interested to such an extent that they will devote the necessary time to it.

A word on the question of your state organization. I agree with Dr. McManus absolutely on the point that the state society should not meet more often, but you should have a closer affiliation of your local societies with the state society, and frequent meetings should be held among the local societies. Your state society cannot induce a very large percentage of your men to actively participate in the papers and discussions; it is impossible because there are too many men. In the local societies the object should be to persuade every member to do something during the year; you cannot have these local meetings too often, provided there is proper interest. The frequency of the meetings should naturally depend on the interest that is being taken in the work, but I see no reason why, in Connecticut, many of your local societies should not meet once a month. We have found it to be of great advantage for our men to come together often, take dinner, and then have a meeting following, and occasionally invite an essayist for the evening from some other section. I might mention in this connection one rule that we have followed for five years in our state society which has proved of decided benefit to the local societies; that is, the state society gives each local society the privilege once a year of inviting

any member of the state society to visit them and read a paper. The local societies select these men and make all the necessary arrangements, and the state society pays the traveling expenses of the men so invited. This gives each local society the opportunity to have some outside visitor to put a little new life into the meetings. There are many things of this kind that naturally develop as the result of close affiliation between the local and the state societies. You cannot too soon become established on the basis that most of the western states have adopted, in which the local societies are an actual part of the state society. The local societies elect their members in their own territory and they thereby become members of the state society, which makes it practically a large organization with subordinate organizations that elect men to the higher body. This enables the societies that are strong and healthy to help those that are weak. In thinly populated portions of the state, for instance, where in some cases there are only about three men to the county, and several counties are combined into one society, these men naturally have difficulty in conducting meetings, and our state society has for a number of years spent probably twice as much as the dues from some of these societies amount to in order to make their meetings interesting. We are thus enabled to keep these societies going, while as independent local societies they would not receive enough money to sustain themselves.

The proposition of a closer affiliation with the national society, by which all the state societies should be members of the national, is a good one, but I question whether the time is now ripe when such a movement can be carried out successfully, for many reasons which it would not be proper to discuss now. But before we have a national organization that will embody all or very many of the state societies, we must first have a better organization of the state societies. I think it is absolutely necessary that this should be so, before we can have the proper kind of national association; yet I believe the time for that will soon come, and

then I hope this association will be organized on a better plan than that of the American Medical Association. We have the opportunity to surpass them in at least one respect, even if they have shown us the way in many others. The one defect in their plan is that a man can be a member of his state society without being a member of the American Medical Association. I hope that our plan can be arranged in such a way that a dentist must become a member of all three—the local society, the state society, and the national body—and pay one fee for all three societies. We will then have a distinguished national association with a membership of ten or twelve thousand, which will worthily represent dentistry in America.

Dr. A. J. FLANAGAN, Springfield, Mass. This question appeals to me in this way: What in the President's address would be of benefit to me if I were practicing dentistry in Connecticut? and on this I am going to talk. If your interests are the same as mine have been in the past, you will appreciate what I am going to say on this subject.

In the first place, I wish to commend the president for having given us a most businesslike, that is, a most epigrammatic, telling, and concise address. If a member of any calling has even a very small ideal of professional ability and honesty within him, he yet represents a part of that calling—and it is better to be a small part of a good calling than to be a big part of a poor calling. In all great movements of world-wide importance a few individuals have started the ball rolling. If the history of the world proves anything, it must be equally true that we are confronting a like condition in our own calling. I am interested in dental charity, because I believe that we have certain altruistic duties toward the public, and I am vitally interested in the question of educating the people to the necessity of oral hygiene, and to the importance of our calling in the field of preventing disease. How are we going to accomplish this? Suppose I were practicing here in Connecticut; what benefit would this movement be to

my profession, and how can it be carried out? If you have in your normal schools teachers that are going forth to teach children, does it not appeal to you as a natural starting-point for this society to select some representatives that can give an address on hygiene to these teachers? Would that not be a concrete something that these teachers could take away with them? Again, if you have certain philanthropic or charity organizations that meet in certain parts of the state during the year, would it not be most practical to have the state society send some men to address these meetings? There are also certain newspapers published in this state—and I am well acquainted with one in this city, the *Waterbury American*—whose editorials are read the world over; now, would it not be proper to prepare articles in simple language to educate the people in the knowledge of dentistry? There is at the present time in various parts of the country a great national agitation against tuberculosis. It is within the province of every intelligent dentist to notice a few phases of tuberculosis that come under his observation. What is to prevent the dental profession from taking part in the public demonstration that is now being held all over the country? For instance, what would prevent us from showing certain models and certain statistics demonstrating the part which constricted arches play in shutting out the air-supply from the lungs? Physicians have shown the deleterious effects of adenoids, and why should not we show certain deleterious conditions in the mouth? That is a concrete something which the average person can grasp, but we have not done it. Let us take up this work. I might go on and mention case after case where we could do wonders; but who is going to take the initiative? Somebody will have to start the ball rolling.

If the National Association had never accomplished anything except the dental catechism which they published on the care of the teeth, they would have accomplished a great work. If you are interested in educating your patients along that line, send for these pamphlets

that have been authorized by the National Association, and in putting forth such literature your patients and others cannot say that you are solely interested in the financial end.

In closing let me say: In every calling there is jealousy, there is envy, even in the church, and why should we in this imperfect world expect to accomplish perfect results in an imperfect environment? But let us try to elevate our calling, and let us consider it the duty of each humble representative to do his share in the advancement of the profession, for that means the advancement of each individual.

Dr. E. S. GAYLORD, New Haven. After listening to the very interesting discussion upon this most admirable address, it seems entirely unnecessary that I should add a word. In regard to the meetings of this organization, it occurred to me that we might pattern our society after the Massachusetts society, which has district societies, and have the district societies represent something that would lead up to the state society. We have in different sections of the state organizations which could be converted into district societies, and an incentive might be created among these societies to exceed each other in the number of members which they send to the state society. Dr. Black emphasized that these local societies should select different essayists from the state society; in that way it seems to me great interest could be created in the local societies, and through them in the state society.

Dr. BEECHER (closing the discussion). My purpose in advocating dental inspection and examination in public schools is simply to agitate the matter. You will not accomplish anything, as Dr. Black said last night, without agitating the subject. If you stir up matters, then practical plans to bring about the best results are possible, and we can work out the best plans to meet conditions as they present themselves.

Dr. Black covered the question of frequent meetings in a different way than I had thought of, but the point is that from a financial standpoint the local or-

ganizations as we have them now are not in a position to go to the expense of holding frequent meetings without the aid of the state society, and many times there are not more than ten or twelve men in attendance. Then, again, Dr. Black has given us an instance of a society which has eleven hundred members; in an organization of that kind the best results are obtained in a different way from what I had thought of. My idea is that the men should get together more than once a year. We have dozens of men that we do not see more than once a year, and then some men attend the annual meetings in one year and others in another year, and in that way they do not get to see each other very often. If we have more meetings and have a closer union and affiliation, the men would have more opportunity of rubbing elbows with each other and become better acquainted.

I wish to thank the gentlemen for the very liberal discussion of my paper, and for the large attendance at this meeting and the attention given to my address.

Motion was made that the President's address be accepted and placed on file.

Motion carried.

The next order of business as announced by the chair was the reading of a paper by Dr. CARROLL B. ADAMS, Bridgeport, entitled "An Antiseptic Cement."

[This paper is printed in full at page 963 of the present issue of the Cosmos.]

Discussion.

Dr. C. W. STRANG, Bridgeport. No more important subject has been brought before us recently than that presented by Dr. Adams in his paper. You will all agree with me that the quintessence of nastiness is reached in the oxyphosphate in a crown or bridge that has been in service a few years. Any method, therefore, by which the impurities, the unwholesomeness, and the disagreeable effects of the oxyphosphate after a time in the mouth can be prevented, will be heartily welcomed. I was very forcibly impressed with the porosity of the oxyphosphate fully fifteen years ago, and the

incident, which I will here relate, may be of interest to you. A young lady came into my office with a large cavity and an exposed pulp in a bicuspid, the cavity extending above the margin of the gum; in order to prevent the arsenic from doing harm, the rubber dam was adjusted, the decay removed, the arsenic applied and carefully covered with an oxyphosphate filling, and the patient dismissed. When the patient returned, viz, about thirty-six hours after the application, I was astonished to find unmistakable evidence of arsenic poisoning on the gums. I could hardly believe my eyes, and asked myself if it were possible that the oxyphosphate had allowed the arsenic to percolate through the filling.

Only a little while afterward one of my old patients had the misfortune to break off the labial plate of enamel of a central incisor. The pulp was not exposed, but nearly so, and the patient being somewhat timid would not allow its extirpation. At that time we did not know of the advantages of cocain pressure anesthesia, and I made an arsenical application as near the pulp as possible, covering it with oxyphosphate, which was the only suitable material. When the patient returned for the second treatment there was an eschar on the inner portion of the lip directly over the oxyphosphate, and then I was convinced that oxyphosphate was one of the worst filling materials for covering arsenical applications. I would a hundred times rather trust cotton saturated with sandarac varnish for preventing the arsenic from leaking and injuring the soft tissues than use oxyphosphate to retain the arsenical application. I have heard gentlemen speak of carefully sterilizing root-canals, filling them with oxyphosphate, and then over that placing a permanent filling, and they seemed to flatter themselves that they were giving the roots of the teeth the most perfect protection possible. These men, I think, are laboring under a very great delusion. I believe that in those cases copper oxyphosphate is a far better protection than the zinc oxyphosphate.

The preparation and the treatment of

the oxyphosphate as suggested by Dr. Adams should, it seems to me, meet with hearty approval.

Dr. E. S. GAYLORD, New Haven. I wish to say first a word of commendation of the idea which Dr. Adams has presented to us, and then a word in justice to the manufacturers. Those of us who used oxyphosphate fifteen years ago, or even ten years ago, will bear out the statement of Dr. Strang that it is a decidedly objectionable material, but, since that objection has been raised by the profession, I am sure the manufacturers have improved the character of their oxyphosphates. Notwithstanding their efforts, however, it is still objectionable in that respect, and I am very glad indeed that Dr. Adams has brought this suggestion before us. The only criticism I would offer of anything that he has said is that he has not presented this to us before. He says that he has been familiar with it for twelve years. How many valuable methods have been withheld for twelve years? So many are brought before us and recommended as very essential, important, and valuable, after they have been tried perhaps only a few months.

I hope to stimulate Dr. Strang and draw him out in regard to his method of using oxyphosphate in connection with amalgam, and in regard to the condition in which he finds the oxyphosphate after having used it in that way.

Dr. STRANG. In answer to Dr. Gaylord's question, I would say that I have never used the combination of amalgam and oxyphosphate for setting crowns, and am therefore not able to give him any light upon that subject; but as far as fillings are concerned, I believe that this combination is more wholesome and less subject to infection than—I will not say the very best gold fillings that have been inserted and then removed from the teeth—but certainly less subject to the infection and the impurity connected with it than is found in about ninety-five per cent. of the gold fillings inserted, particularly those that have been built upon a mat of soft foil. If you properly prepare the cavity and insert the combina-

tion filling, with which I have been somewhat familiar since 1890, you can hardly tell about the condition of the fillings, because they do not come out in a mass. If it is necessary to remove them, they have to be taken out in small particles; you cannot get the filling out in a mass, because it adheres so firmly to the walls of the cavity. I do not think that fillings of oxyphosphate and amalgam are at all permeated by the mouth secretions—at least I have never suspected it. This combination, I think, is impervious to the secretions of the oral cavity, and is one of the very best protections that tooth structure can have. There is in my opinion no material that affords such perfect protection to tooth structure as the combination of amalgam and oxyphosphate—and this opinion is based on an experience of nearly twenty years.

Dr. SPICER. In what proportion do you combine them in fillings?

Dr. STRANG. In answer to that question I would say that I am on the program for a clinic this afternoon, and I can give all the information pertaining to that subject better than I can at the present time, because this question seems to me to be foreign to the subject we have before us just now.

Dr. A. J. FLANAGAN, Springfield, Mass. Dr. Strang tells us that the question of the mixture of the amalgam and cement is foreign to the subject, but I disagree with Dr. Strang. I believe that he has a duty not only toward the dentists of Connecticut but also toward those of Massachusetts, because we are using the Strang method there with success.

Let us reason a little. Dr. Strang made the statement that when root-canals have been filled with oxyphosphate of copper cement he finds less—I would not say infection or bacteria, but certainly less odor—and I think we will all agree on that. If that is the case, what was it due to? Dr. Gaylord says that the makers of cements are manufacturing now an anhydrous cement. Is that your statement, doctor?

Dr. GAYLORD. Partially.

Dr. FLANAGAN. When I went to the Philadelphia Dental College, I had the

privilege of visiting Dr. Flagg's laboratory quite often, which was a very fair laboratory as judged from the standard of that time; I saw some of his experiments on cements. I wonder how many men have asked what oxyphosphate cement is made from. Dr. Gaylord says that it is anhydrous. I wonder if any manufacturers in the entire world are making an oxyphosphate filling material at least ninety per cent. of the base of which is not made of a very hydrous substance known as zinc oxid. In other words, is there a cement whose base is not zinc oxid? If there is, the manufacturers have been keeping it from us hitherto; they are keeping many things from us, and we are to blame. If we are using certain kinds of drugs, is it not the duty of the dental profession to know what is in them, and what their component parts are? Dr. Strang says that he uses copper oxyphosphate with better success in root-canals. What is that made of? May his success not be due to the fact that there is a greater proportion of copper in it, and that copper has a germicidal property? Dr. Strang says it is best when incorporated in amalgam. Now, his amalgam is metal. Suppose you use a submarine alloy, composed of sixty parts of silver, thirty-five parts of tin, and five parts of copper. Any man who has practiced twenty years must have come to certain conclusions with regard to the beneficial effect of the addition of copper to amalgam. The scientists have not been able to tell us why it has this effect, but we know it has. If in the use of cement you add foreign materials, how much cement have you left? I want to warn dentists here today as to the addition of certain foreign materials to cement.

I wish to congratulate Dr. Adams on his paper; there is certainly a great deal of profit to be derived from it, and his method is worth trying; but I am one of the doubting Thomases, and why? Simply because, if you will go back in the history of dentistry, you will find in the DENTAL COSMOS of about twenty years ago that a Dr. S. S. Stowell of Pittsfield claimed that he had dis-

covered a material that would prevent decay, and with which you could cap pulps successfully—and always prevent recurring decay. What was his powder composed of? Hydronaphthol and cement, and he promised all sorts of fine results from it; but do you hear of it today? Go back in history twenty years, and you will find that hundreds of men used it. Dr. Gaylord, didn't you use it?

Dr. GAYLORD. Yes.

Dr. STRANG. When you find me, after what I have seen, abandoning amalgam and oxyphosphate, you will find me abandoning dentistry altogether. I would be delighted to show you teeth that were filled in 1890 with amalgam and oxyphosphate, first molars, second molars, that had been almost wrecked in early childhood, and yet these teeth are today perfectly preserved, and nothing more has been done with them except what has been done by the patient. When I have such evidence I cannot go back on the combination. I do not wish to claim any originality for that combination. I saw a statement in regard to it in one of the dental journals in about 1890, and I began experimenting with it, and what I know about it has been derived from my own experimentation and experience since that time.

Dr. FLANAGAN. I trust that Dr. Strang does not construe my discussion as opposition to his method. I have no criticism or opinion in relation to Dr. Strang's method, but I should like to know from Dr. Gaylord why he abandoned that cement. I should also like to ask Dr. Strang if he ever used that cement? I believe Dr. George A. Maxfield was another practitioner favorably inclined—at that time—to indorse this method.

Dr. STRANG. No, but I knew about the Stowell cement.

Dr. GAYLORD. I am delighted to have the opportunity to tell Dr. Flanagan why I discontinued the use of that cement. Does Dr. Flanagan recognize the fact that the material of which he speaks becomes absolutely worthless after exposure to air? It is a very unstable material, and for that reason what little efficiency

it had was absolutely lost in a short time. In other words, gentlemen, it did not fill the bill, and consequently I dropped it.

Now, without any intention of discourtesy to Dr. Adams, I should like to ask Dr. Strang to give us his method of using this filling material at this time. I think this an opportune moment, and we shall all be glad to stay and listen to him, as no doubt it will be very profitable to us all.

Dr. FLANAGAN. My motive in bringing out this point was that we are all striving for the truth, and I certainly want the best results in my practice, and am very proud of the fact that Dr. Gaylord has given his reason for doing away with that cement, because it simply illustrates the point I am getting at. Just go back to the days of the Archite cement, and think of the way we have been led astray in different kinds and combinations of filling material. We must consider very carefully the effects of mixing different medicaments with cement. I do not wish to be misconstrued as saying anything against Dr. Adams' method, because I believe that he would not offer us anything unless he believed it to be a suitable material and one worth while. I am glad, however, that Dr. Gaylord has thrown a little light on one of the materials which we were led to adopt several years ago. We have known practitioners to replace fillings with filling materials which have had added certain medicaments which have affected the lasting quality of the cement. We should make experiments with such mixtures, place them under the microscope, and find out what sort of mixture we have, and then we can work on a scientific basis and on the proper deductions, and will not be led year after year into using materials that we know nothing of.

Dr. ADAMS (closing the discussion). The questions raised by Dr. Flanagan as to previously introduced combinations are fully answered in the detail, little though it be, of my paper. I was aware of these conditions, and enumerated them in my paper intentionally and advisedly.

Dr. Gaylord seems to think that I have

intentionally withheld a valuable method, and if I have, I owe you an apology. I began using this compound about twelve of fourteen years ago, after considerable experimenting with it, and since it proved itself valuable in my opinion, I finally used all zinc phosphate cements in that way. About three years ago I thought that perhaps it was something worth writing about. I spoke to several practitioners about it, and tried to give clinics on it on several occasions, but I assure you, gentlemen, that I had to force attention to it. I came to Hartford last fall, and gave a clinic in which I presented this method, and sat half a day at a table, and was asked by two men about the method.

Hydronaphthol is soluble in water, and for that reason I cast about for a long time for some effective antiseptic that would not be soluble in water. I selected a substance that chemistry tells us is soluble in twelve hundred times its volume in water; therefore I say it is scarcely soluble, and I know the permanence of its effect.

In conclusion, I am led to quote here a saying which I once heard: "I am not arguing with things, but I am simply telling you them."

Dr. C. W. STRANG, Bridgeport, was extended the privilege of explaining his method of making combination fillings of amalgam and copper oxyphosphate. Dr. Strang spoke as follows:

When I began this work, I had the idea that one amalgam was as good as another for the combination filling, and after experimenting with the different amalgams and watching the results, I have come to discard every amalgam but one. I have selected Lawrence's amalgam for the combination, because I obtain better results from that than from any other amalgam; why, I cannot tell you. The amalgam that has given the poorest results is the Fellowship alloy; why it does I likewise do not know. The best results I have generally obtained in soft immature teeth. Take the case of children at about the age of nine years, with the first molars almost riddled with

decay, with pulps almost exposed; these cases are the most unpromising as far as permanent operations are concerned. The rubber dam is adjusted, the decay removed, the cavity dehydrated and prepared just as thoroughly as for a gold filling, except that not quite as much tooth-structure need be sacrificed, but all the disintegrated portions of the tooth are removed and the margins are shaped as cleanly and as well defined as in a gold operation, although it does not matter if the edge is somewhat attenuated. Then all the instruments necessary for packing the material are laid in a position of ready access, because, when the material is ready to be placed in the cavity, it must be inserted without delay, as it becomes hard readily and is liable to disintegrate in packing. I then begin the preparation of the material. The amalgam is put in a mortar; about the same quantity of filings is used as required in making an amalgam filling alone; then the mercury is added and ground thoroughly with the pestle until the filings are thoroughly incorporated with the mercury. The mix should be a trifle more plastic than in a pure amalgam filling. After the filings are incorporated, the mortar is washed with alcohol, dried out with a napkin, and the mass replaced in the mortar. To this mixture about one-third in bulk of zinc oxyphosphate is added and ground up. I obtain better results with the Harvard oxyphosphate than with any other. Others may perhaps get as good results with other cements, but I have become accustomed to the Harvard and I am using it exclusively. I then thoroughly grind the oxyphosphate powder and amalgam with the pestle in the mortar. Then about the same quantity of phosphoric acid as would be required in mixing the oxyphosphate powder alone is poured out, and a little of the powdered amalgam is incorporated, mixing as thoroughly as if cement for setting a porcelain inlay. The powder is gradually incorporated, and then with a thick heavy spatula it is worked into a ball, and a little more of the powder is added, so that it has the consistence of putty.

In that state the mixture is ready to be introduced into the cavity, which is done with burnishers at different angles, as required in cavities in different portions of the mouth.

If after two or three years there is a defect in such a filling along the cervical wall, I know that I have failed to pack the filling thoroughly at that point. I do not believe that it is in the least affected chemically by the secretions of the mouth, but is subject to change only owing to the attrition brought to bear upon it by use.

If I have to fill a very large cavity in a posterior molar, that is, one not easy of access, I do not attempt to make a mix sufficient to entirely fill the cavity, but I make two mixes. With the first mix about one-third of the cavity is filled, and after waiting two or three minutes another mix is made and the operation completed. There is a danger of trying to do too much, if the cavity is complex. In the anterior portion of the tooth, where you come to the masticating surface, do not attempt to make one mix and fill the cavity, but make two mixes, and then be sure to make a perfect filling in all parts of the cavity. My only objection to this material is that it discolors the tooth and imparts a dark shade to the enamel walls, therefore in filling an upper second bicuspid I should not put that material against the external wall, but would flow against that wall the whitest oxyphosphate obtainable, and place the amalgam and cement combination over that. The material adheres to the tooth structure, the dentin and enamel. It is the stickiest of filling materials that I know. Five minutes after the filling is placed, it is hard enough to be shaped up properly. It is not necessary to keep it dry more than five or ten minutes. No lasting polish can be imparted to the material; there is simply no polish to it. The appearance of such a filling is its worst feature, and because this material does not take a polish, some have condemned it without any further deliberation. It does not make a handsome filling, but it preserves the teeth most satisfactorily.

The meeting then adjourned until the evening session.

TUESDAY—*Evening Session.*

The meeting was called to order on Tuesday evening at 8 o'clock by the president, Dr. Beecher.

The first order of business was a paper by Dr. A. D. BLACK, Chicago, Ill., entitled "Cavity Preparation Based on the Pathology of Dental Caries."

[This paper is printed in full at page 957 of the present issue of the Cosmos.]

Discussion.

Dr. R. OTTOLENGUI, New York, N. Y. I have been delighted with the three-ring circus produced by the paper, the lantern lecture, and the demonstration, but I am not sure in which ring I am expected to perform. As I was asked to discuss the paper, I shall confine myself to that. I am glad, however, that this demonstration has occurred, because it concerns tooth-surfaces which were not considered in the paper; that is, the paper was mainly devoted to molars and bicuspid, whereas here we have a central incisor—which brings me to the point I want to make.

In the first place, I wish to say of Dr. Black—and as the gamblers say, "That goes both ways"—that there is nobody who has greater admiration for Dr. Black than I have, and for the work that both the essayist and his father have done for the profession. If I take exception to anything in this paper, it must be accepted as a compliment to these gentlemen, by which I mean that if these gentlemen had no prominence I would not take exception to anything they might say; but in proportion as men have prominence, in proportion as they are great teachers, should we scrutinize what they teach us, because on account of their prominence and on account of their scientific attainments, their word carries with it the more weight.

The principal exception which I wish to take to the paper is in regard to what may seem to you a small matter, one of

nomenclature, but if anybody is responsible for the growing use of the word "proximal," it is Dr. Black's father. I am somewhat of a lover of language, and I feel almost that we have less right to take liberties with language than with politics or religion. These latter are matters of sentiment and belief, and not exact sciences, but those who contribute to make language inexact, contribute just so much to the difficulty of expression of thought. Let me say a word about "proximal." This is not a new topic, for Dr. J. W. White wrote on it some forty years ago, and what he said is as true today as it was then. As I understand that the proceedings of this society will appear in the DENTAL COSMOS, it will have been the third or fourth time that a discussion of this subject has appeared in that journal, which only proves a statement in the first part of the essayist's paper, namely, that it is difficult to carry a truth home against habit and custom. It is largely through the teachings of the schools in the West that this word proximal has such a wide usage. What does it mean? We should not use a term which no one outside of our craft can comprehend. If Dr. Black were coining a word to describe this surface of the teeth, I should take no exception, but the word existed in the language before, and meant something totally different from what it is used to express now by some dental writers. We are certainly very closely allied to the medical profession, and we should be able to comprehend medical literature, and medical men should be able to comprehend dental literature. In medical parlance the word proximal is used in opposition to the word "distal." For instance, the surgeon speaks of the distal and proximal sides of his operation, proximal meaning nearest to the operator and distal indicating the other side. In the dental field, we figure from the middle of the mouth, and speak of the mesial and distal; the word proximal to the medical mind means opposite the distal, and to use it for what for us may mean either a mesial or a distal surface must certainly be confusing to medical men. I should like Dr. Black to

give in closing the discussion some good reason for leading us to misuse this word, though the really correct word, whether it be easier to use or not, is approximal.

Let me say a word about contact points, which is an exceedingly important feature of this paper. The essayist has very beautifully shown us on the screen, the advantage of the round contact point, and as he calls it in some cases, the exaggerated contact point. A very interesting point comes up in these days, when dentistry is dividing into specialties and we have a very lusty infant, orthodontia, shouting for recognition, in this close inter-relation between these so-called specialties and dentistry itself. For almost the first time we see a picture of occlusion thrown on the screen in connection with the teaching of cavity preparation. If you can recall that picture of occlusion and remember the point which the essayist so well made, namely, that the first upper bicuspid, for example, falls between the two lower bicuspids and drives the food down into the space between the two, if you remember that that is normal occlusion, and think of those inclined planes, you will realize that to inordinately move these teeth apart and then build in an exaggerated tooth-form with the idea of saving your teeth really amounts to breaking up your occlusion, because these inclined planes after having been moved apart must necessarily operate against the occlusion of the upper teeth, and so disarrange the arch. In many cases, of course, Dr. Black's advice can be followed, because we have many sets of teeth that are in occlusion, consequently a little more contour could not make much difference, but when we are dealing with teeth in normal occlusion it would not be wise to exaggerate the contour of a tooth.

I entirely agree with the position of the essayist that oftentimes such exaggeration of the filling would be advisable, but this end can be accomplished in another way—not by moving the teeth apart, but by cutting away the tooth to be filled and then restoring it with a filling which shall have the proper contour. This in my opinion is one of the chief

advantages of the cast gold inlay, and since I have been using the cast gold inlay I do not separate molars and bicuspid at all. I treat the teeth in the positions in which they are presented to me, and in that way I am sure of one thing, namely, that the tooth upon which I am operating is not moved in its socket, but is in the position which it is to occupy after the operation. This wholesale cutting away of the tooth which is to be restored is a serious factor when you use the filling process, but not when using the inlay, because it is practically no more difficult to make a large inlay than it is to make a small one. Moreover, these contact points can be made very much more exact in inlays, because the exact contact point can be over-built in the wax inlay, and in the final fitting and setting you can polish down the gold so that it occupies exactly the position desired.

I have in the past taken issue with Dr. Black's so-called principle of extension for prevention, but I do not disagree with him so much now as I did then—partly, perhaps, because I understand him a great deal better—but still it seems to me even now that his teaching is somewhat radical. It is difficult for me to fully believe that approximal decay is quite as circumscribed as we are told it is. For example, I wish to call your attention to those pictures of decay in the enamel and dentin assuming the forms of triangles. We have been told that on the approximal surfaces the spread of the decay of the enamel will not pass around the buccal and lingual angles of the tooth; yet this has not been my experience. There are of course a good many cases where the spread does not pass around the corner, but in recent years I have been watching this closely, and I find it far from uncommon to see this caries in approximal surfaces of bicuspid and molars assuming a pyramidal form, with the base toward the gum; the angles on this base line very often reach around the angles of the tooth. And curiously enough, in spite of the fact that the tongue washes the tooth in this location, I have often found this en-

croachment extending around the linguogingival angle of the tooth. All have seen cases where it is difficult to place the rubber dam because it would drop into just such a cut. I know very well that in the case of an extensive cavity of that kind we might argue, and the essayist probably will argue, that this enamel has been decayed from the dentinal side and has been crushed in; but remember that at these angles there is no crushing stress. It has been my custom to depart from the teaching of some, and to prepare my cavities, even for gold inlays, with the rubber dam in place, just as is done with the gold filling methods. I very commonly start by thoroughly cleansing the approximal surfaces of these teeth, using a fine cuttlefish disk, with the idea of thoroughly cleansing the surfaces, and by this means and by dehydrating one may detect those areas in which the rods are not yet broken down, but in which the cement substance has been lost. I have very frequently found this extension running along the margins of the gum toward and even around the buccal and lingual angles of the tooth.

The argument is made that because the inception of decay does not occur at this point it is practically immune, but this does not seem to me to be true. Inception of caries rarely occurs at these angles, but I fail to see why it should not extend to or beyond the angle. Why should it stop and not go around when it approaches that area? You are all familiar with the clinical condition that I am about to describe. I have seen a number of mouths in which there is practically no approximal decay, but in which caries along the buccal margins of molars and bicuspid is exceedingly prevalent. In many instances, if you simply cleanse the teeth you find decalcified enamel extending as a white line all along the gum margin, and undoubtedly around the angles of the tooth, both in molars and bicuspid. In these cases the caries does not stop, and the decalcified enamel is not limited when it reaches the angle of the tooth; I therefore fail to see why, after starting on the approximal surfaces,

caries cannot extend around these corners.

You may ask, What is the practical point at issue here? The practical point is, that if these areas were really immune and caries could not begin at these points, there would be no special necessity for extending cavity margins into these areas of immunity, because we are told that the inception of caries always takes place at or near and in the gingival direction from the contact point, and that caries spreads from that point. If that were true, why should we extend the margins any farther than what we might call the infected tooth-structure?

This is largely a matter of tweedle-dum and tweedledee, because I believe that I cut my cavities as large as those that were shown in the pictures tonight, but I bring up the question because I am confident that a great many people who are following the Black school do not stop at what we might call the approximal limit of the margin of the tooth, but extend their margins plainly into view. This brings me to another point.

In the first portion of his paper the essayist speaks of the causes which control decay, and he speaks of saliva as one of the elements which brings about immunity and practically admits that it is *terra incognita*. He also says, what is no doubt true, that periods of immunity vary; that individuals who are practically immune at one time may have an onset of decay at another. But he must admit also that it is true that patients who have rapid, rampant caries in their mouths very frequently exhibit immunity later on. If that is true, it seems to me that we should not have a dogma for filling teeth—that we should not simply have a mechanical system for the preparation of cavities. In this matter we should be more physicians than mechanics, and this brings me to my point.

I have under my care at the present time a little patient who came to me for orthodontia services, and who has been under my care and observation for five winters. She has not had a single carious tooth in that period. Her age,

when treatment was started, was fourteen, so that she is now nineteen. She has undoubtedly enjoyed immunity, of course aided by her own hygienic care of the mouth; but, as is my custom, I recently had her come to my office that I might remove the retaining devices, simply to be sure that the bands, which were held in by cement, were still firmly cemented. My custom is not to allow retainers to remain in place any great length of time without removing, cleansing thoroughly, and replacing them. To my surprise I found in this case a slight roughness between the central incisors, not enough, as Dr. Black pointed out, to be considered as cavities, but I suspected an onset of caries, and on separation found that both of these teeth were involved. They are at the present time the very smallest cavities or carious places imaginable. Here, then, is the mouth of a fine-looking young woman, with a fine set of teeth, and I cannot, in spite of all the science that is back of this proposition, bring myself to the point of cutting out much of those teeth, when I know that I can fill these cavities with invisible fillings, and in spite of what I might call my affection for porcelain, I would not cut these cavities large enough to put porcelain fillings in them. Now, why? Because I know that in that particular mouth, and in that environment, the chance that there will be a recurrence of decay around the tiniest of fillings is as one in a thousand. I think it my duty to try to save these teeth without much cutting, because no matter whether the extension be made so that the margin will show or not, you cannot fill these teeth with anything, porcelain or gold, if it is cut much, without disfiguring them to some extent by producing a shadow which will always despoil that mouth of its beauty. And so I say I believe that there is a great deal of value in these scientific data which have been brought before us, and we certainly should take advantage of them, but I do not think it proved that it is absolutely necessary to cut cavities as extensively as has been shown by many of the disciples of Dr. Black, and I doubt very

much if Dr. Black himself cuts as widely as some of his disciples do. It is very much to our credit, and we owe a very great debt to Dr. Black and those who have followed his teaching, that we have arrived at the point where we must feel that cavity preparation is not a mere mechanical proposition; that something more is involved than the retention of the filling; that we must understand the etiology and the progress of caries and the liability of its recurrence in order to properly place fillings so as to minimize any recurrence, and that in reality we must become scientific tooth-fillers, and as I said before, also, if you please, tooth-physicians.

Dr. GILBERT M. GRISWOLD, Hartford. I have been wondering why I should have been selected to discuss this paper with the noted gentleman who has just spoken.

Dr. Black has said that it is not so much the question of further knowledge as the practical application of our present knowledge in the preparation of cavities in accordance with pathological conditions. I believe this is true, but the question arises, Why is it that the majority of dentists do not practice in accordance with these principles which he has so clearly set forth in his paper? Possibly it is because cavity preparation is not practically taught in our colleges. Everyone who has been on an examining board has wondered whether it is taught at all. We had some forty-seven candidates last year before the Connecticut board, only seven out of this number being non-graduates, and out of the entire number not over four showed any knowledge of the subject of cavity preparation along proper lines. Their aim and object seemed to be only to shape the cavity so that it would retain the filling long enough to be examined by the board. This is a sorry fact, but a true one, and the colleges should teach more thoroughly along these practical lines. Dr. Black may be looked upon by some as an extremist. Be it as it may, what would we do without extremists in the world? He has certainly presented ideals for us to work up to, if possible. It may be questioned, however, if it is

wise for all beginners to cut as extensively as it would seem that he does, for it requires experienced judgment to follow out the preparation of cavities as he suggests.

I would not criticize or take exception to anything the essayist has said, because he has told us many truths which should be uppermost in our minds. There is one thought, however, relative to small cavities in approximal surfaces, which Dr. Black claims should be cared for many months before they really are cavities. In the majority of cases this should be considered, but is there not a class of cavities in these surfaces in which, by properly trimming or changing the shape of the surface and polishing, decay can be checked for a long time, if not permanently, without filling and without cutting so extensively?

I have nothing further to say, as the paper was so thoroughly discussed by Dr. Ottolengui, except to thank you, gentlemen, for the opportunity afforded me of taking part in this discussion.

Dr. M. L. RHEIN, New York, N. Y. I have been exceedingly interested in the admirable manner in which Dr. Black has presented to us his thoughts on this subject. While I thoroughly indorse most of the practical applications which he has demonstrated, I take exception to a number of points which he has raised. In the first place, I have for some years taken serious exception to the opinion expressed in the West, and again by the essayist tonight, that extension for prevention is a western idea, and that we are converts to this idea, while exactly the opposite is true. I have made this statement a number of times, and have for years been waiting to establish my statements to disprove that idea. Those of the older members of this society whose memories go back as far as 1870 and the early eighties will bear out my statement that there has never been a more earnest advocate of the value of extension of cavities, such as has been portrayed this evening, than the celebrated operator, Marshall H. Webb, and the clinics that he gave all over this country bear witness to that

fact. More than that, his work on operative dentistry is an attestation to that in the illustrations of his articles. Therefore as a resident of the East I take most serious exception to statements that are not in accord with the historical data on this subject. I admit that Professor Black has put into writing the arguments showing the value of prevention perhaps much more scientifically than Dr. Webb did in his time. Had Dr. Webb lived, there would never have been a more thorough, strenuous, and powerful advocate of this doctrine than he was, and to this every student who had the pleasure of studying under him will attest. I feel that I would be recreant to my duty as a student of his if I failed to bring out this point whenever such an opportunity as this presents itself.

I wish to express my adherence to the criticism by Dr. Ottolengui concerning the misuse of the terms "proximal" and "approximal." I had occasion to take this same position a few weeks ago at the meeting of the National Dental Association held at Birmingham, Ala., and I trust that the illusion that seems to pervade the practitioners in that part of the country from which the essayist comes, regarding the misuse of this term, will not be a lasting one.

I am a strong advocate of the value of extension for prevention as illustrated by the essayist this evening, but I thoroughly disagree with the manner in which this doctrine is being constantly enunciated today. The manner in which this principle is being taught renders it undesirable and dangerous to the coming dentists, just as dangerous as the inlay fad is in the way in which it is being taught. Although it may not be the teachers' intention, the idea is conveyed to the student that dental operations are like the manufacture of shoes or clothing; that all you need is a model to pattern everything after. Anyone reading the works on cavity preparation—which has been so beautifully described and so beautifully portrayed tonight—cannot fail to be impressed with this point. I am not speaking now in reference to the practitioner of experience, but to the

student body: Too little attention is being paid to the fact that a cavity, and sometimes a disease, must be studied individually and treated individually according to the conditions that present themselves. I thoroughly agree, for instance, with the idea of the essayist that when caries has once attacked the enamel to such an extent that the sharpest point of an excavator will penetrate it, such a cavity should be immediately filled, and one should not wait for the caries to attack the dentin. But on the other hand, I thoroughly agree with the views expressed by Dr. Griswold in regard to the large class of cases in which caries presents itself in this way, and in which under certain conditions it can be stopped, and has been stopped forever, at that point. The essayist in his paper, however, makes no differentiation as to these two conditions. In a general way we may say that the essayist's ideas are more applicable to younger patients, and those of Dr. Griswold to patients more advanced in life, and this is due to the fact that conditions of immunity or inhibition of caries present themselves differently at these different periods in life. All of us who have had any extended experience have seen many cases of beginning caries in enamel that have been absolutely stopped by thorough polishing of the surface; we can therefore bear witness to the success of this treatment in a certain class of cases, and it is this particular point that I wish to stress. A paper of this kind should point out carefully the fact that there are frequent exceptions to the general rule—that is to say, the exceptions are so frequent that you cannot establish an infallible rule.

Again, while I feel thoroughly in sympathy with the general method of shaping cavities as shown by the essayist, I feel that he has not persisted sufficiently in establishing immunity from destruction of the enamel rods in the preparation that he has outlined. It would not be satisfactory to me to follow the illustrations that he has given us here and the general manner in which he is leaving the cervical margin of the cavity. In other words, I prefer a slightly

inclined bevel of the cervical margin at this point [illustrating], especially in order to protect the rods from the pressure exerted in inserting the filling, and also from the consequent enormous stress of mastication. I am not speaking now of this particular cavity, but am simply using this illustration in referring to the cavity preparation as outlined by the essayist for approximal surfaces in bicuspid and molars. In such cases a very great benefit is derived from a very slight outward bevel of the cervical margin.

Dr. BLACK. Do you mean toward the gingival border?

Dr. RHEIN. Yes, and I think we protect the rods there against destruction. In my practice not one case of recurrence of caries at this point has occurred, and I have heard so much of recurrence of caries at these points that to a certain extent I attribute my success to my taking an infinite amount of pains in the manner in which I prepare the margins at that point, realizing that it is the place where not only the greatest stress is brought to bear in inserting the filling itself, but that it is where the constant strain of mastication is manifested more distinctly than at any other point in the entire tooth.

The hour is too late for me to enter into this subject as I should like to, but I do not wish to close without again stating the fact that the principle of extension as illustrated tonight is not an unknown quantity in the East, but has generally been practiced by the best operators in the East. I do believe, however, with Dr. Ottolengui, that a large number of men have exaggerated the principles involved here and have gone 'way beyond the essayist's ideas, and to unnecessary extremes, in carrying out these principles.

It is very novel for me to corroborate so many opinions of my friend Dr. Ottolengui, because as a rule we do not agree on these points, but I wish to bear clinical testimony to another statement that he made, and that is, that we cannot accept as anywhere accurate the statements made by the essayist as to the circumscribed area of caries. I do not believe that clinical facts will bear out his

statements. The reason that I have for making such a positive contention is the same as I have for making the other contention as to the possibility of polishing out certain incipient carious spots. I believe that this statement is true in certain conditions, in certain mouths, and with certain environments; but especially in pericemental conditions such as Dr. Inglis will very likely speak of tomorrow morning, the essayist's statement is not in accordance with such clinical facts as have come under my observation. We see all kinds and variations in the manner in which caries attacks tooth structure; that is to say, the essayist's observations are not borne out by pathological conditions in the mouth.

Dr. N. A. STANLEY, New Bedford, Mass. I have traveled nearly all day so that I might be present this evening and hear Dr. Black's paper. The idea that prevailed in my mind in regard to cavity preparation by Dr. Black's method had been somewhat prejudiced from seeing work done by youthful adherents who exercised rather more enthusiasm than common sense.

The idea of extension for prevention is not new. Dr. Eugene H. Smith, dean of the Harvard Dental School, instructed us in this form of cavity preparation twenty-five years ago, when I was a student in that school. But I find that students are apt to err in not cutting sufficiently, even after they have been repeatedly shown and taught the wisdom of such preparation.

It was only experience in actual practice that corrected my timidity in hewing to the line, for failure occurred in just the places that Dr. Black has described. I can but agree with the essayist that it is wise and well to attend to approximal surfaces about as early as there is indication of decay.

While it may not be germane to the subject, suppose we begin a little earlier still, and by prophylaxis eliminate to a large degree any possibility of decay! This is perfectly feasible and practical.

I wish to thank Dr. Black and compliment him upon the skill with which he has handled the subject.

Dr. O. T. RULE, Meriden. I should like to ask the essayist why he makes the incisal point the strongest point of retention. It seems to me that this being the easiest point to get at, and there being no dislodging stress against such a filling as outlined in this cavity, there is no need for any stronger retention at that point than at any other. Also, in packing gold against the cervical margin, would you condense thoroughly each layer? or put a mat of gold there and mallet on that and finally burnish it down to form a perfect joint so that there would be no excuse for lack of adaptation in the material used there?

As regards polishing away either uncalcified or decalcified enamel: Take, say, for instance one of the labial uncalcified streaks at the gum margin; if there were ever so slight a break in it so that a small point would go into it, would Dr. Rhein polish that out or not?

Dr. RHEIN. I tried to make it clear that if the sharpest excavator penetrates the surface, I believe it should be filled; but those I had reference to were cases in which evidence of caries has appeared, yet where it is impossible to break through the enamel.

Dr. BLACK (closing the discussion). In view of the fact that this audience has sat so patiently until this hour, I shall make my closing remarks as brief as possible.

In the first place, I wish to call your attention to the fact that the subject of this paper was cavity preparation, not prophylactic treatment, or internal medication for the correction of salivary conditions, or orthodontia. Oftentimes, however, in the discussion of a paper we obtain some splendid points from a slight digression from the actual subject, and I am not criticizing the speakers for doing that, but simply offer this as an explanation why I shall not reply to some of the statements made which did not exactly refer to the paper.

As to Dr. Ottolengui's remark about the contact point, I did not say that we should get extra separation and build out a prominent contact in all cases, but that in many cases we could build out a more prominent contact, make the prox-

imal surface more convex, and thus materially limit the cutting in the buccal and lingual directions, and I want to maintain that statement as strongly as I possibly can. There might be cases in which the building out of a prominent contact would disarrange the occlusion. All cases are not, however, of absolutely normal occlusion by any means, and not in all arches are all the teeth present, and while I am willing to admit that there may be cases in which the occlusion might be slightly disarranged, yet I am not willing to retract the least particle of my statement that there are many cases in which we can do what I have said without in any way disturbing the occlusion. I would take decided exception to Dr. Ottolengui's statement that he would not move the roots apart at all in making a filling. In cases of caries of the proximal surfaces, with the marginal ridges broken in, the teeth often move out of their proper position, and it is the duty of the dentist or orthodontist to put the teeth back into position in order to restore proper occlusion.

There have been many converts to extension for prevention since inlays came into general use, because inlays cannot be made without such extension in a good many cases. It is easier to insert a large inlay than a small one, and it is easier to put in a large gold filling than a small one, and so far as time and wear and tear on the patient are concerned, I should take my chances on the gold filling in all average cases. I do not wish to go into the discussion of gold fillings, but I know that for many patients I can make a gold filling with less fatigue to the patient than an inlay would cause, and in a good deal less time, and I am willing to prove this at any time. I use inlays, but not in average cases.

I should like to keep the discussion as close to the ordinary average cases as we can. We cannot lay down a rule for anything to which we could not find exceptions. Take Dr. Ottolengui's exception in the case of the young lady with the beginning of decay on the proximal surfaces of the centrals. I suspect that the carious spots were produced by the abnormal condition of the appliance.

Dr. OTTOLENGUI. No, not at all.

Dr. BLACK. Did you not have an arch on the upper teeth?

Dr. OTTOLENGUI. It was not the action of the appliance at all; it was regular normal caries at the usual contact places where there was no fixture at all.

Dr. BLACK. Did you have a wire on the labial surface?

Dr. OTTOLENGUI. Yes.

Dr. BLACK. I would not retract my statement. When you have an appliance, a wire, or an expansion arch around such teeth, you have an abnormal condition there. This patient, who was practically immune to decay, could not give these teeth actually the same care as she could under ordinary conditions.

Dr. OTTOLENGUI. I want to answer that point for this reason: I believe that there is no greater crime of which orthodontia has been accused than regulating teeth at the expense of producing caries. In this particular case, however, it would be absurd to attribute these minute carious spots to orthodontic appliances. As far as possible, in my practice, the regulation of teeth is an advantage, because it inculcates the habit of proper oral hygiene. In regard to this labial wire that you speak of, this girl was taught not only to clean her teeth as any child should do who has no appliance in the mouth, but also to polish the teeth under this wire and in the interproximal spaces, and consequently the presence of the wire has been an advantage in inculcating the habits of oral hygiene, which the child would never have acquired if the wire had not been there.

Dr. BLACK. Whenever you have such an appliance in the mouth, you are more liable to have decay. With the expansion arch you may have strain enough to move the maxillary bones apart, making a slight space between the central incisors, so little that even Dr. Ottolengui may not have noticed it; a little something may have been caught between them, and in the particular case of the immune patient that is the one place where this is liable to happen.

Dr. OTTOLENGUI. In this case they were more closely in contact.

Dr. BLACK. Referring to the state-

ments of both Dr. Ottolengui and Dr. Rhein regarding the spreading of decay across the angle of the tooth, Dr. Rhein wants figures. I can refer him to a record of an examination of ten thousand cases, in only nine of which decay had spread across the angle.* I do not say that it does not spread across, but this is a record of an examination of the teeth of every patient who came to our school in a year, and in almost all the cases where this was found there was some abnormality that accounted for it. I do not ask you to accept this, but if you will keep a record of the mouths of your patients you will be convinced of it. You must remember that the patient has thirty-two teeth and that there are four angles to each of these teeth. When we see one in which the decay has spread across the angle, it makes an impression, and we must remember that when we see one of these cases, it is only one angle in one hundred and twenty-eight.

Dr. RHEIN. I think your percentages are wrong. It is a question of the number of patients in which this is found, and not of the number of teeth in the individual mouth. There are a great many teeth that never decay at all. I think it is the percentage of the number of patients and not the number of teeth that you should consider.

Dr. BLACK. I only ask the gentlemen to make a record, and show the percentage of cases in which caries has gone beyond the angle, and I am certain that a careful record will be a good argument in favor of my contention.

Dr. OTTOLENGUI. You know that nothing lies like statistics. You have heard the essayist state that he has examined ten thousand cases and found less than ten in which the decay has spread across the angle. Now, I wish to show how that does not at all cover the point which I wish to make. It sounds as if there were only nine cases out of ten thousand. As a matter of fact, if you are going to establish statistics of the limitation of caries, you must only count the teeth in which it goes to

* "Operative Dentistry," by G. V. Black, vol. ii, p. 142.

the angle and no farther. Do not count those that have incipient caries or those that have no caries, but pick out in his record of ten thousand cases the teeth where it goes to the angles and no farther, and your statistics will alter.

Dr. RHEIN. I have an absolute record of twenty-nine years of private practice, absolutely diagrammatic records, and I want to say to the essayist that I take extremely little stock in these statistics, for this reason: The statistics are garnered, as I understand it, by the young demonstrators in the infirmaries. Now, it is not a question, as Dr. Ottolengui says, of the caries proceeding to some prominence around the angles; these are the ones that impress themselves upon our minds, but when they start on this erratic course they are frequently stopped in time; but that was far beyond the point as outlined in your paper. I believe that I have diagrammatic records to substantiate my position. Unfortunately I cannot give you the statistics from memory, but I feel from the facts as I have studied them that I cannot give credence to the statement made in the paper.

Dr. BLACK. I would be willing to allow my statement to stand on a record produced by Dr. Rhein, or by any man who has a careful record of the examination of many of these cases, because I have been keeping a few records myself, and know I am not mistaken. I know that sometimes caries will go around the angle, and usually there is some particular reason for it, but those cases are very rare, and we cannot apply general rules of practice to these very rare cases. Certainly caries goes around the angles very much less often than it goes close to the angles and stops, and the reason why caries goes there and stops is just the point I call your attention to, because the cusp of the opposing tooth pushes food through the embrasure between these surfaces and scours the angles every time the patient chews.

I appreciate the fact as well as anyone that many men go too far in attempting to follow these teachings. But what are you going to do when you have a lot of men who don't go far enough, and a lot

who go too far? You have to keep in the middle of the road, and try to induce some from each side to come nearer to the middle.

I have no quarrel with Dr. Rhein as to where extension for prevention started, and when in my preliminary remarks I spoke of the difference between the East and the West, I was basing my judgment on the operations that I see and the teaching of the schools, and certainly they do not teach that method in the eastern schools, Dr. Rhein, as we do in the West. I am willing to give any man credit, and no one admires Dr. Webb's work more than I do, and I have no doubt that had he lived we probably would have today the teaching of extension for prevention in our eastern schools, and I am sorry for the people of the East that Dr. Webb died so early.

About the word approximal, I wish to cite you a little history. Dr. J. D. White, when he was editor of the DENTAL COSMOS, decided that he wanted to use the word approximal for the reasons mentioned here tonight, and he went to certain men who were publishing dictionaries and tried to get the word recognized. Their reply to him was that they did not see any use for the word, that it had not been in use, and that if he would produce any evidence of its being in the literature of the profession, they would put it in the dictionaries. So Dr. White wrote articles in which he used the word, published them in the Cosmos, and sent them to the dictionary authorities, and they put the word in.* Proximal means next, and approximal means next. Just because medical men use proximal in a certain sense is no reason why we should use it in that way.

Dr. OTTOLENGUI. Proximal means nearest.

Dr. BLACK. My reason for preferring the word proximal to approximal is to avoid the jerk that you see both these gentlemen give to the diaphragm every time they use the word approximal.

Adjourned until Wednesday morning.

* See glossary, "Operative Dentistry," by Dr. G. V. Black, vol. i, p. 301.

(To be continued.)

READING FREE DENTAL DISPENSARY.

Opened under the Auspices of the Reading Dental Society and the Associated Charities, June 1, 1909.

THAT the efforts toward the establishment of free dental dispensaries for the poor are bearing substantial fruit is evinced by the following clipping from the *Reading Telegram* of May 30, 1909, which we take pleasure in reprinting at the request of the secretary, Geo. S. Schlegel, D.D.S.:

**"OPENING OF FREE DENTAL DISPENSARY
AT HUMANE SOCIETY BUILDING. ITS
PLAN OF OPERATION.**

"The new Reading Dental Dispensary has been opened at the Humane Society's building, 114 South Sixth st., and there will be a public inspection next Tuesday [June 1, 1909] from 2 to 9 P.M.

"The dispensary will be open for free dental service to the indigent poor every afternoon except Saturdays, from 1.30 to 5. It will be in charge of the members of the Reading Dental Society, each serving his turn. A lady assistant will also be employed, to attend to the making of records, dispensing of materials, etc.

"The management will be in the hands of a Dispensary Board, consisting of six members of the Dental Society. These will be elected at each annual meeting of the society. This board will present a written report annually to the Reading Dental Society and the Associated Charities.

"Ten years ago a member of the Reading Dental Society read a paper before the State Dental Society advocating the establishment of free dental dispensaries for the care of the teeth of the indigent poor. Several years later the president of the Reading Dental Society, in his an-

nual address, recommended the appointment of a committee to make an estimate, and if possible, to procure funds toward the establishment of a dispensary in Reading. Little was done, however, until December 1908. At that time the society found a philanthropic citizen who volunteered to assist in raising the funds required to equip a modern dental dispensary. Twenty-five resident members of the Reading Dental Society at the January meeting voluntarily subscribed over a hundred dollars to start the fund. At the April meeting each signed a resolution whereby he offers his services gratis, one-half day each month, at the Reading Free Dental Dispensary, as long as he remains in legitimate and active practice in Reading.

"The committee in charge of this work secured rooms on the first floor in the Humane Society building. The rooms have been thoroughly equipped with the most modern and sanitary appliances. These appliances and materials were secured from the various dental houses at discounts ranging from 20 to 50 per cent., and many dental houses gave liberal donations.

"The dispensary expects to receive its patients mainly through the public schools. The principals of each building have been provided with application blanks to be filled out by the teachers, etc., and then referred to the Associated Charities for their investigation and indorsement. Any other deserving person may secure free dental service by applying to the Associated Charities, 539 Franklin st., between 9 to 12 A.M. and 2 to 5 P.M., Saturdays excepted."

THE DENTAL COSMOS

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Devoted to the Interests of the Profession.

EDITED BY

EDWARD C. KIRK, D.D.S., Sc.D.

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PHILADELPHIA, AUGUST 1909.

EDITORIAL DEPARTMENT.

THE DENTAL INDEX BUREAU.

THE National Institute of Dental Pedagogics, at its St. Louis meeting in December last, officially instituted a movement far-reaching in its effects which will be of incalculable benefit to the dental profession, provided a fair share of sympathetic support is given to it by those for whose benefit the work is undertaken. It is proposed to prepare and issue to subscribers a topical index of periodical dental literature as contained in about ten dental journals for 1908-09 and to extend the index over additional years as rapidly as possible. The index is to be furnished to subscribers at the moderate cost of twenty-five dollars per year, and will enable the user to refer at once to all articles or notes upon any given topic that have appeared in any of the ten journals embraced by the index during the years covered by it. A circular giving full particulars in reference to this matter has

been issued, which because of its interest and importance we print in full in another department of this issue (see page 1038).

It is constantly said, and with a fair degree of justification, that the dental profession is not a reading profession—that practitioners of dentistry are not, generally speaking, interested in the literature of their profession. To anyone who keeps in touch with current dental literature it must be evident that but few writers ever take the trouble to familiarize themselves with what has already been written on the subjects which they themselves write about. Again, the criticism is constantly made that writers of articles in dental periodicals fail to give due credit for ideas or suggestions published by other writers on the same or allied topics; and as a further evidence of this general lack of familiarity with the literature of dentistry it is the constant experience of those in editorial charge of our dental magazines that they are appealed to for assistance in securing data and information upon topics that have been frequently written about and recorded in our periodical literature and with which it is fair to presume the profession at large should be familiar. The editorial departments of our magazines are by force of circumstances compelled to conduct, in a way, bureaus of information for essayists, those interested in state legislation, education, dental history, and in fact every department of dental activity. This work is done cheerfully by the editorial management of our journals, and it is not because of the slight burden that is imposed upon the editorial staff in that way that attention is directed to the conditions under consideration, but rather because they clearly indicate the need for more personal attention to the volume of literature which our technical journals are issuing each month; and when requests come from newly elected members of state boards of dental examiners asking for information upon the subjects assigned to them for examining applicants for the dental license, as quite frequently happens, the need for a more definite and practical interest in the standard and periodical literature of dentistry is manifest.

It would seem to be superfluous to direct attention to the importance of keeping in touch with the latest thought as expressed upon all professional subjects in our periodical literature, and it would be superfluous were it not for the fact that a real-

ization of the necessity is not as general among dental practitioners as it should be. The man who does not read the literature of his profession quickly becomes a routinist and a back number; he loses the stimulus of intellectual competition and falls by the wayside in the march of professional progress. The unceasing activity of those who are reaching out for better methods, for the elucidation of fundamental principles upon which new procedures are based, soon leaves the man who does not read far behind in the professional race.

In extenuation of his failure to keep abreast of the literature of his profession something may fairly be said on account of the time and labor involved. The reading habit is essentially a habit, one that ordinarily has to be cultivated, and comparatively few find sufficient pleasure or compensation in the systematic reading of professional literature to devote the necessary time to it—to “wade through” the mass of it in order to get at the particular features of interest and importance to them individually. To the man with the reading habit this wading process is not difficult, and from constant training it often becomes a source of pleasure, but to the average man without such training it cannot be denied that the task of even superficially scanning the monthly output of dental journals is a laborious task. It is to the great majority who do find journal-reading a labor that the “Dental Index” of the Institute of Pedagogics will come as a boon—as it will furnish in concrete and easily accessible form an index to all the articles on any desired topic published within the scope of time which the Index covers. The “wading through” process will have been done by the experienced readers of the committee, and their labors will furnish a direct access to the latest thought of the profession, which all possessors of the Index may avail themselves of without any preliminary labor whatsoever.

We hope that the Index may receive the cordial and sympathetic support of the whole profession, and that its practical use may, as one of its results, be to eliminate the grounds which exist for the criticism that we are not a reading profession, and may above all have the effect which the committee anticipates for it in a postgraduate educational way.

AN ERROR OF FACT.

As to Arsenic in Silicate Cement.—In the issue of the *Cosmos* for May 1909, pp. 625 and 626, we published a *résumé* of an article by C. Struempell, on "The Discoloration of Silicate Cements," appearing in the *Schweizerische Vierteljahrsschrift für Zahnheilkunde*, No. 4, Zurich, 1908, in the course of which it is stated that one of the silicate cements under discussion contained arsenic in varying quantities both in the liquid and in the powder, and that this contamination, which the author believed was responsible for certain cases of pulp-irritation and pulp-death, reached in one instance as much as 3 per cent. of the total weight of the cement. The manufacturers of the cement in question, Ascher's Artificial Enamel, have furnished the writer with affidavits from reliable chemists in New York certifying to the fact that they have analyzed the cement in question, both powder and liquid, and find it free from arsenic. The writer has, independently of the foregoing, had analyses made by a competent chemist of two samples of Ascher's Artificial Enamel furnished by a well-known dental practitioner who had experienced some difficulty from discoloration of fillings made with this cement, and it was found to be free from arsenic, the discoloration complained of being due to other causes, possibly to traces of bismuth which the cement was found to contain. It is hardly conceivable that a manufacturer of dental cement would risk the reputation of his product or his own reputation by issuing a cement for filling teeth containing even a trace of arsenic, the destructive properties of which are so thoroughly well known. We therefore gravely doubt the accuracy of the statements in Dr. Struempell's article.

We make this explanation as a matter of justice to the manufacturers of the Ascher's Enamel, in the belief that whatever criticisms may be made of it, the assertion of the presence of arsenic in its composition is at least not warranted by the evidence.—EDITOR DENTAL COSMOS.

REVIEW OF CURRENT DENTAL LITERATURE.

[*Archiv für Zahnheilkunde*, Berlin, March 1909.]

A METHOD FOR THE EXACT FITTING OF GOLD CROWNS. BY DR. H. W. C. BÖDECKER.

The best restoration of the natural crown of a bicuspid or molar is probably a gold crown that absolutely fits the root. Poor marginal adaptation, however, has often led to failure, and the gold crown has therefore become unpopular with many operators. The chief reasons for failures are poor preparation and

inexact measuring of the root. The usual methods for this measuring are very inexact in many cases. As the perfect inlay depends upon an exact model, so the perfect gold crown depends upon correct measurement of the root. Two methods for measuring are at our disposal: First, the wire of the odontometer, second a set of rings of different sizes. But even with the greatest painstaking it is not possible to obtain the correct measurements in every case. The odontometer is insufficient if the root is partly destroyed deeply under the gingiva, and the ring does

not indicate the correct size if the circumference of the root is irregular, as in upper bicuspid and deeply carious lower molars. To secure an exact reproduction of the circumference of the root, the author has designed the following combination method: The root is measured with the ring or the odontometer as usually; then the wire or ring is slipped on a measuring staff as far as possible, and the spot of exact fit is marked. This measuring staff is a long pointed staff of about 25 cm. in length, its circumference gradually increasing from 15 to 40 mm. Furthermore, rings of various sizes are required of very thin copper plate, the same as used in taking the impression for gold inlays. A ring is selected that will exactly fit at the spot indicated on the measuring staff. If the copper ring is too small, it can easily be stretched a little on the staff. Then the ring is trimmed so that it reaches the edge of the root everywhere, and is fitted in the mouth. The copper being soft and thin, the trying-in causes less trouble to operator and patient than the trying of a gold crown or gold ring.

If the ring fits satisfactorily, a short cone of impression material, the diameter of which is a little smaller than the ring, is pressed into the ring. After chilling with cold water, the ring and impression are carefully removed together.

On examining the impression we shall often be disagreeably surprised. The ring, which according to old methods represented the finished gold crown, is far from fitting as perfectly as was imagined. The impression shows whether our measurement was correct, or too small or too large, and whether the circumference of the root has any peculiarities, or whether it has been prepared correctly. If the edges of the roots appear sharply defined, and if the ring has penetrated everywhere sufficiently under the gingiva, the impression is satisfactory. If, however, it is faulty in any respect, the root must be prepared more perfectly, and another impression must be taken. If Sharp's method for finishing the crown is followed, a model fitting the case is selected, considering only the height and contour of the crown and leaving out of consideration the cervical width. The impression of the root is then filled with plaster, preferably alabaster. After hardening, the model is trimmed before the impression is removed.

All surplus of plaster is removed, the copper ring serving as a guide, and a plaster bar remains the diameter of which corresponds to that of the ring. The impression is then removed from the model, and the upper portion of the bar is so trimmed that its circumference shows the same form as the root, which can be recognized by the other end of the bar. Before trimming, the distance reached by the copper ring under the gingiva can be marked on the model by an ink line. The seamless crown or, if another system is followed, the gold ring, is then made and fitted on the model. If it be too wide, it must be cut open on one or both sides; if too narrow, it can be dilated by swaging. After annealing, the crown is carefully fitted to the model; the approximate shape of the root can be imparted to it by suitable pincers. The border is beveled with hand-polishers so as to fit snugly to the model in its entire circumference. Then little or no difficulty will be encountered in setting the crown on the root. For the crown a very pliable gold is used, either pure or platinum-gold plate. In this way a perfectly fitting crown can be secured.

[*Oesterreichisch-Ungarische Vierteljahrschrift für Zahnheilkunde*, January 1909.]

A RARE CASE OF DEFECTIVE NUMBER OF TEETH. BY DR. R. KLEINER.

The patient, an under-developed young woman of twenty-two, gave the following anamnesis: She had been backward as a child, and had suffered with rhachitis in her first year. The deciduous lower incisors and canines had never erupted. No tooth had ever been extracted. The patient's family shows normal dentures. The patient herself is below medium height, of frail osseous structure, and wears a light support owing to a moderate rhachitic curvature of the spine. Her hair is normal, contrary to Busch's observations on the coincidence of anomalies of the hair and teeth. The maxilla is shortened in its longitudinal and transverse diameter. The dental arch is normally curved, the centrals of normal size are separated by an interstice of 3 mm. breadth, the laterals are missing entirely, leaving a gap of 5 mm. between the centrals and canines. Both the right bicuspid are rotated around their longitudinal axes; the left canine has erupted only to two-thirds of its length; the second

molar is missing on both sides. All upper teeth are strongly labially inclined.

The mandible exhibits total absence of all six front teeth; the alveolar process, over which the easily movable gingiva forms a fold running in a sharply defined, almost straight line. The second molars on both sides, with their masticating surfaces, are inclined toward the tongue. The shape of the mandible considerably deviates from the normal. Instead of an arch representing a parabola, we find the above-mentioned straight line connecting the first bicuspid. The mandible has the shape of half a hexagon, thus showing the characteristic alterations due to rhachitis. The shortening of the transverse diameter of the maxilla causes an irregularity of articulation. While the articulation is normal on the left side, the buccal tuberosities of the antagonists articulating at least, on the right the articulation seems to have deviated toward the median line, the buccal tuberosities of the upper teeth articulating with the lingual tuberosities of the lower.

The mandible itself seems to have deviated mesially toward the maxilla. The anomaly in numbers of the teeth is sufficiently corroborated by the non-eruption of the missing teeth in the deciduous dentition. This case presents an actual defect in numbers of the teeth not due to any lack of space in the arch, and still extant long after the period of normal eruption of the teeth. The skiagraph proved convincingly the absence of retained teeth, and the origin of this abnormal case is to be attributed etiologically to rhachitis.

Treatment consisted in replacing the missing teeth with bridge work, instead of the rubber prosthesis which the patient had been wearing for years, and which had set up caries on the lingual side of the teeth, especially the upper ones. In the upper arch two second bicuspid were crowned with gold crowns, which by means of a strong bar sufficiently distant from the canine and first bicuspid supported the laterals.

For cosmetic reasons the first lower molars were used as abutments and crowned with gold. A narrow platinum saddle was swaged to the base of the gap and connected with the crown by stout bows. The saddle itself was fitted with pins for the mounting of tube teeth.

[*L'Odontologie*, Paris, January 15, 1909.]

ANESTHESIA OF THE PULP BY COCAIN-ADRENALIN INJECTIONS. By DR. M. H. DREYFUS.

While warning against the overestimation of any one cocaine preparation, the author maintains that any anesthetic not incompatible with adrenalin injected with any syringe at the correct spot will produce ready and certain anesthesia. In order to obtain satisfactory anesthesia of the pulp, the measures to be taken are entirely different from those followed in anesthesia for the purpose of extraction. For the latter, the ligament is impregnated to its full length by forcing the liquid into the densest region of the gingiva, its resistance to the injection constituting a good sign of perfect anesthesia. For pulpal anesthesia, the lip or cheek is raised, and after determining the exact position of the apex by digital exploration, the point of the needle is immediately inserted into the very loose tissue of the gingivo-labial groove, and the apical region is reached by the shortest way by imparting to the needle an almost perpendicular direction to the axis of the tooth. This method offers the double advantage of requiring only a very small quantity of the anesthetic for the impregnation of the apical region, and of reducing the pain to a minimum at the moment of insertion, the needle meeting with no resistance. As the liquid penetrates the tissue very freely, no special syringe is necessary. A few moments after the injection, the mucous membrane, without becoming white, assumes a vaguely pale shade, which secondarily involves gradually the gingiva to its entire height. In most cases, pulpal anesthesia is obtained in one minute and a half or less, in rare cases not until after five minutes. In incisors, canines, and bicuspid one single puncture from the lingual side will suffice; in upper molars one or two buccal injections and one palatal one are required. The lower molars present difficulties, the same means producing very different effects, probably owing to the variations in the thickness and density of the osseous lamina, which is generally very compact in that region. As for dosage, one single ampule of one cubic centimeter contents, holding one centigram of cocaine and one-fourth of a milligram of adrenalin suffices

for pulpal anesthesia of four upper incisors. The author also successfully uses ampules of one cubic centimeter contents holding one centigram of cocain and one-twentieth milligram of adrenalin. In single-rooted teeth $\frac{1}{4}$ or $\frac{1}{2}$ of 1 c.cm. of a 1:100 solution of cocain mixed with $\frac{1}{4}$ of 1 mm. of adrenalin per cubic centimeter are sufficient, *i.e.* 2 to 2 $\frac{1}{2}$ mgm. of cocain with from 1/20 to 1/16 of 1 mgm. of adrenalin. If the admixture of adrenalin is increased by one-fourth of a milligram per cubic centimeter, the dose of cocain can be still further diminished.

Dr. Dreyfus claims that he has never observed accidents nor untoward symptoms from pulpal and dentinal anesthesia, which he attributes to his practice of never immediately making definite operations, *i.e.* canal or cavity fillings. If the canal is filled immediately, the operator is never sure when the filling material has reached the apex of the root, and is very liable to force it through. Moreover, very frequently after some time a hemorrhage through the canals takes place, and it is therefore wiser to fill them at a second sitting. If sometimes a few days after the extirpation of the pulp some generally very slight sensitivity of the tooth is noted, this must not be regarded as a sequela of the extirpation. In caries of the second degree this symptom is never observed.

In conclusion, the author announces his forthcoming publication on the action peculiar to each component of the cocain-adrenalin mixture.

[*International Journal of Surgery*, New York, June 1909.]

STOMATITIS GONORRHOICA. BY WILHELM KARO, M.D., BERLIN, GERMANY.

The syphilitic diseases of the oral cavity are generally well known, but gonorrheal stomatitis is unfamiliar even to a great many genito-urinary specialists and dental surgeons. There are two groups of such patients—new-born infants and adults. In infants, the disease occurs a few days after birth, and complete recovery takes place within a few weeks. Dentists hardly ever have occasion to treat such cases, which are left to the obstetrician. In adults, stomatitis gonorrhoeica assumes a very serious form. The few cases that have so far been reported (for evident reasons) have been attended with severe disturbances

of the general health. The pathological aspect of the disease is entirely different from that in infants, because in adults the infection is generally deep-seated and the symptoms are grave. In one typical case reported by Mr. Leedham-Green in his text-book "Treatment of Gonorrhea," London 1908, the mucous membrane of the mouth was swollen and granular, in some places superficially ulcerated. Another case which affords a very vivid picture of this treacherous disease is cited by Dr. Cutler in the *New York Medical Journal* for 1888. The patient, a woman, contracted the disease from a sailor. The next morning her mouth felt raw and dry, and the saliva had a horrible taste. On the second day little sores made their appearance about the lips, and the condition of the mouth remained the same. On the third day the gums and tongue were swollen and painful; on the fifth day the whole inside of the mouth was so intensely inflamed that she was unable to eat, and a whitish fluid mixed with blood, having an offensive odor and taste, was secreted. On the tenth day the patient was compelled to seek medical advice; the lips were cracked and covered with herpes in all stages of development. The mucous membrane of the lips and cheeks was thickened, reddened, denuded of epithelium, and in small areas covered with a false membrane, which was easily detached, leaving a raw surface. The gums were swollen and retracted from the teeth, bleeding readily upon the slightest pressure. The tongue was also swollen, very sensitive to touch and pressure, and could be but slightly protruded, and then only with great difficulty and pain. The surface was marred and glazed in appearance, with small superficial ulcers here and there, secreting a thick yellowish pus. The soft palate presented an inflamed appearance, but beyond the inflamed parts seemed in normal condition. The breath was extremely offensive, although there was but little salivation. The secretion from the mouth consisted chiefly of mucus, pus-cells and epithelium, with the presence of a large number of bacteria. The false membrane contained gonococci. These symptoms were greatly relieved by oral application of glycerin and bismuth subnitrate, together with a mouth-wash of potassium chlorate; the patient disappeared from observation, however, before the cure was complete.

Just as in other infectious diseases, a lesion in the oral cavity is necessary to produce a local specific disease. We must suppose that the normal mucous membrane of the mouth does not present a good nutrient medium for gonococci. Gonococci may be found in the mouth without causing specific stomatitis. In all cases of stomatitis gonorrhoeica, as far as is known, the gonococci reached the oral cavity from the outside. Whether a metastatic stomatitis may also exist, that is to say, whether the gonococci may be carried by the bloodvessels from another part of the body to the mucous membrane of the mouth, has not yet been proved. In theory, however, we must suppose this to be the case.

[*Deutsche Zahnärztliche Wochenschrift*, Berlin, January 9, 1909.]

TAKING IMPRESSIONS FOR INLAYS. BY DR. H. W. C. BOEDECKER.

Two methods for taking impressions for inlays are at our disposal: First, the indirect method, by which a Stents composition model of the cavity is secured, and a die is made on which the wax model is shaped. Second, the direct method, by which the wax model is carved in the cavity itself. The indirect method has the great disadvantage that the model has to go through three different stages, each one of which constitutes a possible source of inaccuracy. The carving of a wax model in the mouth requires as much care and diligence as a cement or gutta-percha filling. Care must be taken in the selection of a suitable wax. Pure beeswax is unfit, as it is tough and not hard enough for modeling purposes. The hardness of the wax is an important factor, and depends upon the admixture of resin. Wax possessing a melting-point of 35° C. is preferred by the author. After melting, the wax must re-harden quickly, and it must allow of easy scraping or carving. A soft wax cannot be scraped at all, only cut, which renders it unsuitable for our purpose, since in cutting the tough mass the form drags. In order to test a wax in this respect a portion is scraped off at room temperature; the surface thus obtained must be clear and smooth, the filings must have a fine grain, and under finger pressure must not roll together into pellets, but crumble. It must also be easily worked with sandpaper. Another requisite of an inlay wax is bind-

ing quality at relatively low temperatures, allowing of its being kneaded and molded in the hand, and its being pressed into the floor of a cavity and against the cervical border. Any folds caused during the insertion of the wax under pressure must be eliminated, so that the wax model forms a homogeneous mass. Wax that possesses a good binding quality at low temperature offers the additional advantage that more wax can be added to it outside of the mouth without distorting the shape of the model. The wax must under no circumstances have real sticking qualities, as it would stick to the instruments in modeling, could not be scraped, and would not permit of a ready removal of the model from the cavity. The color of the wax should be dark enough, so that it can be easily recognized where it protrudes over the margins of the cavity. It must not, however, be so dark that the margins cannot be readily distinguished through a thin layer. The coloring material must be free from metallic substances, as otherwise in burning out the wax the surface of the mold and consequently of the inlay would be impaired. Of equal importance are the instruments used in modeling the wax. Their cutting edges must be as sharp as possible, so that the wax may be scraped under the slightest pressure, which diminishes any possible danger of displacing the model during the carving. For removing any excess present after the wax has been pressed into the cavity, one uses small lancets, curved spatulas, and flat amalgam pluggers which have been ground to a knife edge. For modeling the masticating surfaces a large spoon excavator of about 3 mm. diameter or scaler No. 9 of the big S. S. White set is used. In certain places a smaller spoon excavator of about 2 mm. diameter renders good service. To work out the fissures, a spoon excavator of the same dimensions is applied after grinding its sides to a point. For modeling the approximal surfaces the following three instruments are suitable: For the rough work use a small cement spatula bent to a semicircle and the spatula-like end of a Woodson's amalgam plugger. For modeling the approximal surface of a filling whose cervical edge goes deeply under the gingiva, a long rectangular curved probe is ground so that its horizontal section represents a triangle. One surface should be inclined toward the handle of the instrument. By pressing

this point against the cervical border, any excess can be smoothly scraped off. This instrument can also be used to advantage in smoothing the lingual and buccal margins of the approximal surfaces. Moreover, sandpaper or, better yet, cloth strips are used. These must be of sufficient thickness and rigidity so that they encircle the tooth.

The process of taking a wax impression in the mouth is as follows: If good wax is used the cavity need not be oiled, but is simply wiped with cotton, and the wax introduced. To insure a certain degree of dryness of the field of operation, cotton rolls are applied. The wax stick is slowly heated over an alcohol flame, until a piece can be twisted off with the fingers. The wax should not melt in heating nor should it be kneaded excessively, because its working qualities suffer therefrom. Take for example a cavity in a lower first molar extending over the masticating and distal surfaces under the gingiva. If the interproximal space is very large or, as in lower bicuspsids, very unfavorable of access, a metal plate is placed between the teeth and held in position with cotton during the insertion of the wax. The softened wax is then shaped into a cone, the point is introduced to the bottom of the approximal cavity and the mass is pressed with the index finger downward, until the approximal cavity is filled. Then, by pulling the finger forward, the rest of the wax is pressed into the cavity of the masticating surface. The patient is then requested to close his teeth and to hold them so for at least three minutes, to give the wax time to yield. If the bite is very deep, a piece of thick rubber dam of a size corresponding to the cavity is laid on the wax and the patient is asked to bite. Thereby the danger of getting too high an inlay is partly avoided.

The excess of wax on the lingual and buccal sides of the interproximal space is then removed. The remaining excess is still left. Then, from the approximal side, the probe bent at right angles is pushed into the wax as deeply as possible, and an effort is made to lift the whole mass from the cavity. If this attempt is unsuccessful, it shows that there are undercuts in the cavity walls, or that the wax in the interproximal space is wedged into the inclined surface of the neighboring tooth. In the latter case, the wax must be removed with the curved spatula.

After the mass has been successfully removed from the cavity, it is laid in cold water. Then the cavity surfaces are examined. If there are any projections which might interfere with the smooth removal of the model, they are eradicated with a sharp instrument; any excess of the lower portion of the approximal surface is also removed. The upper portion, however, of this surface lying toward the point of contact with the neighboring tooth is left undisturbed. Then the model is set back in the mouth. If, in the first attempt at removing, some force has been applied, the model is rinsed in warm water, pressed into the cavity with the finger, and the patient is requested to close the bite. To quickly harden the wax, some cold water is squirted in, and the modeling of the masticating surfaces is started.

If there is an excess of wax on the masticating surface, a sharp spatula is heated and the excess cut away, then the patient is asked to bite, and the form is again cooled with water. Then the wax is removed with the spoon-shaped scraper until the cavity margins lie free. With the smaller spoon the impressions which the tuberosities of the antagonist have left in biting are deepened, and with the pointed spoon the fissures of the natural tooth are reproduced. After the masticating surface has been smoothed by careful scraping, the modeling of the approximal surface is begun. To give the form as much retention as possible, the margins of the approximal cavity are first smoothed with the triangular probe. When the margins are scraped smoothly everywhere, the probe is again inserted into the wax, if possible at the same point as before, and the model is lifted from the cavity. It can readily be seen if the wax protrudes at any point over the cavity margin. If this is the case, the model is put back once more, and the margins are scraped. If at any place too much wax is removed, fresh wax must be added at the respective portion. For this purpose the model is lifted from the cavity, laid in cold water, and with a jet of water from a syringe any blood or saliva is washed away. Holding the model in the hand, the portion to be built up is dried with a cold blast, a little wax is heated on a spatula until it is nearly fluid, and laid as near as possible to the margin of the model on the portion to be replaced. Then the model is quickly reinserted, and the

wax pressed over the cavity margin with the curved spatula. This must be done before the surface of the model becomes moist, otherwise the wax will not cohere at the places where it is folded in pressing.

After the margins are satisfactorily smoothed, the approximal surface is treated with sandpaper or cloth strips, a sufficient space between the model and the neighboring tooth having been secured outside of the mouth by careful scraping. In the proximity of the cervical border the strip may tightly clasp the tooth, and can be pulled to and fro under slight pressure. The closer, however, we get to the point of contact, the less should the strip at the same time cover of the entire contour of the approximal surface, which is polished with little or no pressure on the strip. For smoothing the buccal half of the surface at this point, the strip is run loosely into the lingual side of the interproximal space and pulled through slowly, yet closely to the buccal surface of the tooth. The same procedure is followed in smoothing the lingual half, only in the opposite direction. If the bite is unfavorable, the height of the wax model is examined once more by softening the surface of the wax with air from a heated blower and asking the patient to bite. If then at any portion a brightly polished spot is found, it is scraped out. After polishing everywhere, the model is ready. The point of contact is marked, and the model preserved in a small glass or dish filled with cold water.

In restorations of very large contour fillings it is very often convenient to first shape up the portion adhering to the margins, and then to build up the contours and the tuberosities.

In order to mount the model on the sprue wire, it is taken from the water and dried on blotting paper.

The sprue wire is heated and a small piece of wax attached to its point. Then the point of the sprue wire is fastened to the spot on the model, previously marked as the future point of contact. Owing to the wax applied and to the button left after casting, an ideal contact point can be made. After the additionally applied wax has hardened, the whole is laid back in cold water. The sprue wire must never be forcibly pressed into the model.

This direct method of making the wax model offers the following advantages: The

marginal adaptation of the model in the mouth can be examined with absolute certainty; by scraping the cavity surface of the model a smooth removal without dragging is insured, guaranteeing a perfect fit of the inlay; an ideal point of contact can be secured; the masticating surface is perfectly adapted to the individual case; troublesome grinding in setting the inlay is unnecessary. The only disadvantage of the direct method as over the indirect is that in case of a failure in casting a new model must be made. Yet the percentage of failures due to inaccurate models is far greater with the indirect method, and in order to avoid the grave danger of a misfit so often experienced with the indirect method, the small risk inherent to the direct method is to be preferred.

[*Deutsche Monatsschrift für Zahnheilkunde*,
Berlin, April 1909.]

COPPER AMALGAM. BY DR. C. RÖSE,
DRESDEN.

Copper amalgam, like all other dental innovations, has its variegated history. After Miller had demonstrated that it possesses a certain bactericidal action, it was used generally in a most uncritical manner, and in the same way condemned because it did not fulfil all expectations. The author, after having familiarized himself with the manipulation of copper amalgam under Miller's personal instruction, considers this amalgam next to gold as the best filling material available. After many experiments he finds that a copper amalgam which can be worked after the addition of very little mercury gives the best results, provided that the cavity preparation and the polishing have been attended to at least as carefully as in a gold filling. The benefits to be derived from an amalgam that contains but little mercury are the following: Such an amalgam attains a higher degree of hardness, and its wearing away, which is due to purely mechanical abrasion, is much slower. It adapts itself to the cavity walls as closely as cement, and if prepared properly, does not discolor the body of the tooth. The amalgam itself becomes black, the tissue of the tooth remains white (only if present in excess does the mercury enter the dentinal tubules and discolor the entire tooth) thus making copper amalgam the ideal filling material in children's molars, that in later years can be refilled with gold. Children should not be preju-

diced against the dental office by very long operations at an early age, and a skilled practitioner can insert a perfect amalgam filling in a short time. The principal condition for success is the introduction of the material into a perfectly dry cavity. If the cavity is properly prepared there will be no recurrence of caries. Secondary caries is frequently due to careless cleaning and shaping of the cavity, prompted by the blind faith which some operators put in the antiseptic action of the copper amalgam.

Copper amalgam that is poor in mercury must be pressed against the cavity margins with considerable force, thus preventing the imperfect adaptation which is frequently noticed in soft copper amalgams rich in mercury, and precluding secondary caries.

The bluish black, brilliant shade of an amalgam filling poor in mercury surrounded by normal tooth-structure is preferable to the unclean, pale, muddy appearance of amalgam fillings rich in mercury and their surroundings. If after having been in the mouth for from five to ten years the amalgam filling is abraded at the surface by from $\frac{1}{2}$ to 1 mm., it is undercut all around and filled with a new layer of amalgam. If the first filling has been prepared carefully, it is unnecessary to remove it entirely, for if the borders show no caries it is certain that the infection has not penetrated into the depth of the cavity.

Copper amalgam that contains an excess of mercury cannot be freed of it by pressure, be it ever so strong. Pellets of such amalgam have a dull gray appearance, and on heating, mercury globules appear on the surface, which on cooling immediately retreat into the pellets. Pellets of copper amalgam poor in mercury have a brilliant, bluish black mirror-like and slightly oxidized surface from which the mercury globules that appear on heating fall off, enabling the operator to still further reduce the contents of mercury.

[*Archiv für Zahnheilkunde*, Berlin, January 1909.]

HEMOSTASIA AFTER EXTRACTIONS. BY DR. HERRENKNECHT, FREIBURG.

In some cases immediately after extraction more or less severe hemorrhage is observed, which is difficult to stop even with the aid of hemostatics. Such hemorrhage is due either to an extensive laceration of soft tissue or bone, to tearing of major bloodvessels,

or to a pathologic, generally arterio-sclerotic change of the vessels, to the injury of an abnormally situated branch of large arteries, or to hemophilia in the patient. Diseases of the heart, kidneys, or other organs, or the patient's indulgence in wine, beer, coffee, or tea before the operation, may also induce severe hemorrhage.

In a light case of hemorrhage it suffices to lay upon the wound a wad of cotton sufficiently large to be pressed upon by the opposite jaw. If the patient keeps his mouth closed for fifteen minutes, the hemorrhage generally stops. In severe hemorrhage, generally hydrogen dioxide, stypticin, liquor ferri sesquichlorati, ferripyrin, and suprarenal preparations are employed. The first three are preferable on account of their great hemostatic and relatively small escharotic power, the last three have a strongly caustic action, thus unfavorably influencing the healing process. Gauze or cotton are impregnated with the hemostatics and introduced in the form of tampons, the tampons favoring hemostasia by their pressure. Iodoform gauze gives excellent service in not too severe hemorrhage, although iodoform is no specific hemostatic. It is easily and quickly applied, and may be left in the mouth without assuming a fetid odor from the decomposition of saliva or blood. Tamponade is most effective if pressure upon a hard bony basis is exerted. Hot and cold are not efficient in severe hemorrhage. In very obstinate cases the author applies the following method:

Melt pure beeswax in a suitable vessel, heat the wax to 70 to 80° C., immerse a small cotton wad that amply fills the extraction wound, and insert after having carefully removed all blood-clot. Lay a cotton wad on the tampon sufficiently large to exert a pressure on the wound, and direct the patient to keep his mouth firmly closed for half an hour or more. The wax quickly congeals and hermetically seals the wound, usually immediately stopping the hemorrhage. This tampon has the advantage of not decomposing and of being easily removable. If a hemostatic remedy is added, such as 10 per cent. ferripyrin, three factors combine in their hemostatic action—pressure, heat, and the hemostatic drug. The tampon may be left in the mouth for two or three days without being renewed. Instead of wax, paraffin may be used in the same manner and with the

same results. A mixture of solid and liquid paraffin may be made with a melting-point of from 50 to 60° C., this mixture having this advantage over beeswax that its melting-point may be chosen at one's discretion. Tamponade with a 4 per cent. gelatin solution, as has been recently recommended, is not so well indicated as wax, as it is hard to render and keep sterile, and quickly decomposes in the oral cavity. If the hemorrhage has been very considerable, the patient should never be left without supervision, as the tampon might become loose, in sleeping for instance, and a dangerous secondary hemorrhage may ensue. In feeble or awkward patients it may be advisable to hold the tampon in place with the finger until bleeding has ceased.

After every extraction that has been followed by severe hemorrhage the patient must

be warned against strenuous physical exercise or the consumption of large quantities of liquids, such as wine, beer, coffee, or tea, in order to avoid secondary hemorrhage. The introduction of fluids is indicated, however, if owing to great loss of blood, stimulation of the heart is desirable. In such an extreme case, raising of the extremities, careful application of stimulants, subcutaneous injections of physiologic salt solution, and of oleum camphoratum, etc., must be resorted to. In all these measures it must, however, be constantly remembered that hemostasia is often only due to a lessening of the blood pressure and to a change in the composition of the blood specially favorable to coagulation. The therapy during and after hemorrhage must therefore be strictly adapted to each individual case.

PERISCOPE.

Preservation of the First Permanent Molar.—Prevent decay in the first permanent molars if possible by closely watching and protecting them. If decay occurs, stop it at the earliest moment. Employ permanent procedures if practicable, but in any event stop the decay and watch the case. In badly broken-down cases use gold inlays in preference to crowns. Save the pulps alive if possible, but even if pulps are lost never give up a first permanent molar while there is a fighting chance to save it.—A. C. LOCKETT, *Dental Review*.

Method of Removing a Pin from a Root.—Take a large broach, cut it off above the barbs, and bevel it on two sides, so that it will have a wedge shape. Place it in a broach-holder, and with hand pressure bore a hole to the length of the pin in the cement, between the pin and the root. Use the broach as a chisel, cutting the cement so that the chips fall toward the hole. Make each cut the full length of the original opening. Go about three-quarters around the pin, when it can be removed without any trouble.—J. M'GREGOR JONES, *Pacific Dental Gazette*.

Importance of Examination of the Teeth Before Commencing Suppression of Morphin in Habitues.—Of all the precautions the object of which is the resumption of a healthy, normal mode of life, one of the most important is prophylaxis of trouble from the teeth. Those, then, who have to treat morphia cases should be careful to see that the teeth are in a proper state, before the patient undergoes any course of treatment. The use of morphia gives rise to various troubles of dental nutrition, to mention only the most frequent—periostitis, caries, or gingivitis expulsans. As long as morphia is taken, all this may go on without attracting much attention, as the pain is prevented by the analgesic action of the alkaloid, and when toothache occurs it is stopped by an extra dose of morphia. The teeth may fall one after the other without any steps being taken to prevent it. But with the suppression of morphia there is a return of sensitivity, the anesthesia is replaced by nervous hyper-irritability, and if the addicted individual has neglected to have his teeth attended to, he is almost sure to suffer from dental neuralgia. Those, then, who are in the habit of tak-

ing this alkaloid and who are about to make an attempt at renunciation, must not suppose that their teeth will not trouble them because they do not suffer at present. Suffering is certain if there is latent mischief, and this will most likely become a pretext for a return to morphia or cocain, and in this way an entirely preventable pain will be the cause of relapse.—Dr. JENNINGS, *Dental Surgeon*.

Dalma Bridge.—After both abutments have been prepared, a small base-plate is stamped and soldered to the abutments. Then, for the buccal side, plate teeth are ground, and the body is modeled in wax. The wax is removed and an impression of it made in plaster, die and counter-die are made, and the back of the bridge is finished. Then the bridge is soldered to the base, from the inside, and the abutments and the masticating surfaces are reinforced with solder. The hollow space is packed with black rubber and the teeth are vulcanized. This bridge offers the following advantages: The teeth need not be put into the furnace, and their stability does not suffer; the teeth cannot fall out; the teeth cannot be bitten out, since the stress of mastication hits only the gold; the bridge is very light.—M. GOLLOP, *Berliner Zahnärztliche Halbmonatsschrift*.

"A New Dentistry: Prophylaxis."—The *New York Times* of June 22, 1909, thus heads the following communication from Dr. A. H. Brockway of New York city, which was called forth by an editorial appearing in that journal, entitled "The Nation's Teeth":

"Sir,—A retired dentist of many years, I wish to commend your editorial article 'The Nation's Teeth.' Every dentist has seen and known that self-cleaning surfaces of the teeth are least liable to decay, so that it has become almost an axiom that 'A clean tooth never decays,' and yet it has taken a long time to learn and act upon such an obvious lesson. Decay is always external in its inception, favored or retarded by the physical condition of the tooth involved. On this is based the new treatment which promises so much for humanity.

"I cannot do better than to quote from an admirable paper lately read before a dental society and published in the *DENTAL COSMOS* for May. The writer, Dr. Alice G. H. Duden of Indianapolis, an enthusiastic and successful practitioner, says:

"'Prophylaxis is an art or surgical treat-

ment involving manipulative effort as distinguished from the administration of systemic or therapeutic remedies. At the present time this treatment is engaging the attention of those earnest and thoughtful men in the profession whom we look upon as leaders and teachers, and we all acknowledge that by this process we have, for the first time, triumphed over caries. . . . Shortly after my introduction to this revolutionized dentistry I had the privilege, along with five other practitioners of dentistry, of spending two whole days in Dr. —'s office in Philadelphia. During that time we saw upward of forty of the most beautiful mouths we had ever looked upon—dreams of loveliness at which we simply marveled. . . . We had looked in upon a world of dentistry of boundless possibilities.'

"I can myself testify that this is not an overdrawn picture, and what I have seen gives me confidence that the time will come when these ideas will be put into practice by dentists of sufficient earnestness to secure the necessary and willing co-operation of their patients, thereby staying the ravages which threaten 'the nation's teeth.'"—ALBERT H. BROCKWAY, M.D.S.

Treatment of Pyorrhea by the "Younger Method."—First, flood the pocket with a $\frac{1}{2}$ per cent. cocain anesthetic, using a blunt-pointed flexible needle. After waiting two or three minutes begin to remove the deposits, giving all your efforts to one tooth as long as any deposits remain. The instruments used for this work are called the Younger set. By putting knobs of sealing wax on the handles one can have better control of the instrument and operate much longer without tiring the fingers. By leaving the instruments in a large tumbler containing a 50 per cent. solution of lysol, they can be kept sterilized while operating.

When all deposits are removed, force them out of the pocket with a warm sterilized wash, and then flood the pocket with warmed lactic acid, using the same kind of a needle as before, on a common hypodermic syringe. Keep on hand a number of these syringes, so that when the packing gives out in one, another is always at hand.

After applying the lactic acid keep away from those teeth and give nature a chance to do her work. If any deposits have remained, they will be manifest in two or three weeks, and there is but one thing to do—remove the deposit.

Loose teeth should be ligated, banded, or made stationary in some manner. Observe all

surgical precautions. Anything that will increase the blood supply to the parts after operating is beneficial. Massage is good, using powdered sulfur; instruct the patient to do this before retiring. Prophylaxis is very excellent.

If a tooth is extremely sensitive, remove the pulp. A very sensitive pulp will prevent the gum from attaching to the tooth. If the patient has been in the habit of swallowing quantities of pus each day, give something to eliminate it. Anything one can do to improve the general health condition is beneficial.—ROBERT GOODE, *Dental Brief*.

Lengthening Pins.—It sometimes happens that the pin of a Richmond crown is broken off rather shortly within the coping. If an extension of the pin could be made, the crown might be used again. A bit of thin platinum may be rolled up to make a tube that will fit over the broken stub of pin. Into this fitted end push a bit of moldine, and fill the rest of the tube with solder. Then, with the crown properly invested, slip the open end of the platinum over the stub and gradually heat up until the solder flows and fuses all together. This new pin can then be shaped as desired, and readjusted to the hole in the root.

It sometimes happens that a pin has been filed down a little too small. Wrapping on a little of this same platinum and soldering as above will remedy the trouble, or fine platinum or even gold wire may be used for the same purpose.—R. B. TULLER, *Amer. Dental Journal*.

Fissure Cavities.—The outline of fissure cavities must include all the fissures and angular grooves radiating from the carious area, even though the decay be but small. Such a cavity usually begins because of a defect in the continuity of the enamel surface, and if only the carious portion is removed and a filling inserted, the defective fissures remaining are just as likely to decay as originally. It is found that unless filling materials are polished flush with the enamel surface, the thin edge left over the margins will likely be a point of leakage, and later of caries. If angular grooves are left radiating from a cavity, it is impossible to so polish the filling that none will be left over these margins; hence it is better to cut them out and include them in the cavity. Fissure cavities can be extended in undecayed enamel by cutting a narrow slot through the groove with a small dentate fissure bur ground at the point on two sides to make it into a drill. A worn-out inverted-cone bur ground to the same

form will cut equally well. If the hand-piece is given a swaying motion and the point is kept sharp, even perfect enamel can be cut rapidly. If it is found that the dentin is not very sensitive, the drill point may be directed rather under the enamel, which seems to undermine it and allow it to cut easier. It is important that the drill be small—a large drill imparts too much jar to the tooth. Even the smallest size of inverted-cone bur so ground will serve every purpose, because once the enamel is broken, the edges may be chipped in with a chisel or a hatchet excavator. In certain large distal cavities in molars the buccal and lingual walls cannot be reached by a straight chisel, and a curved chisel with a narrow blade cannot be controlled, if force enough be applied to fracture the enamel. The blade is almost certain to drop into the cavity and touch sensitive dentin, or perhaps wound a living pulp. An instrument made in the form of a broad-ax, with the blade short and wide and parallel with the long axis of the shaft, will successfully break such enamel walls without danger to the pulp or the gum tissue.—A. E. WEBSTER, *Dominion Dental Journal*.

Condensation of an Amalgam Filling.—The making of an amalgam filling requires great care and thoroughness in the packing or the condensing of the material in the cavity. It can only be accomplished with flat-end pluggers, either serrated or plain. It is not reasonable to think it possible to thoroughly condense amalgam in a cavity with round or ball burnishers; in condensing this material, the plugger must be of such form that the amalgam will be carried ahead of it and into contact with the wall of the cavity, and if we consider for a moment what occurs when a round or a ball-shaped plugger is used, we will see the folly of its use for that purpose. When a thrust or impact is made, instead of the amalgam being carried by it against the cavity wall, we see it slipping out in all directions, and unless the instrument fairly fills the cavity there is no condensation of the material, but on the contrary, we see the amalgam bulging up around the instrument, leaving the cavity wall upon all sides.

Let us take a flat-end plugger as large as will conveniently enter the cavity, and in order that the tendency to slip may be overcome, have it serrated; however, when using a serrated plugger care should be taken to keep the serrations free from amalgam, as it takes a spherical form, and instead of having a flat-end plugger it will be of the

oval form. Then, with a good strong thrust carry the amalgam to the floor of the cavity, and with a smaller plugger of the same form commence as with gold, and condense from the center toward the walls of the cavity, stepping the plugger only its width, with each thrust directing the plugger point so that the filling material will be condensed directly against the walls of the cavity.—G. F. WALLACE, *Dental Era*.

Repairing Bridges.—The pins left by the broken tooth are cut off entirely, and for the reception of the newly selected tooth two exactly fitting holes are burred in the backing, and given a funnel shape lingually. The new tooth is fitted, and the pins are shortened with a small stone in the engine; at the same time their ends are roughened. Then the tooth is pressed firmly with the finger from the labial side, and a revolving burnisher is applied to the roughened ends of the pins until they are pressed into the opening and fill it entirely. By using additional burnishers of different sizes the rest of the pin is shaped into a small button. In this way the tooth is replaced almost as well as if it had been soldered on. This method is indicated in quick emergency repairs within the month, and has proved itself successful in a case of one year's standing.—MAX ORDOVER, *Pawelz' Zahntechnische Reform*.

Etiology of Dental Periostitis.—Mayrhofer has found that streptococci can develop in the depths of a tooth when a layer of cotton and the filling above are sterile and airtight. He has traced the source of reinfection in these cases to streptococci lurking in the depths of the tubules of the dentin of the root. They escape in these sheltered nooks the action of even the most vigorous antiseptic cleansing of the cavity. He found them in more than 200 cases. Staphylococci seem to be unable to proliferate in these minute tubules, as they grow in bunches, but the streptococci, proliferating in lengthwise chains, find conditions favorable for their development. They may lie latent for months and years until aroused by some lowering of the general resistive vitality from chilling or other cause. He suggests further the possibility that these streptococci lurking in the depths of the tubules in the dentin may be responsible at times for the development of puerperal fever, erysipelas, pyemia, and sepsis, as well as of alveolar pyorrhea and bone process. Mayrhofer's investigation is based on research in 240 cases of gangrene of the pulp.—*Journ. Amer. Med. Association*.

Preparation of Upper Incisor and Canine Roots for Collarless Porcelain Crowns.—(1) Grind the labial half of the root to just beneath the gum margin, forming a flat surface at an angle of 45° or 60° with the long axis of the root. (2) Grind the palatal half to a flat surface at right angles with the long axis, leaving the palatal margin projecting slightly beyond the edge of the gum. (3) Pass a square-end fissure bur one thirty-second of an inch into the root-canal, and cut a groove of this depth to the palatal margin. (4) Using the same bur or a sharp-edged stone, make a second cut along the palatal margin, crossing the first at right angles, and forming with it a T-shaped groove. The angles between the arms of the T and its stem must not be more than a right angle, but may, if preferred, be less. (5) Enlarge the root-canal to admit the post, and still further enlarge the orifice of the canal, leaving a slight space about the post, and also round over the angle at which the first groove meets the root-canal. (6) Slightly bevel the sides of the grooves as you would in preparing a cavity for an inlay, so that the impression of the root and the post may be withdrawn together.—H. THEODORE BINNS, *British Dental Journal*.

Making the Wax Model for a Cast Shell Crown.—In making cast shell crowns, wax shells of various sizes may be secured, or may be quite easily made by dipping an oiled form (round polished wood, or a piece of brass rod) into the melted wax and chilling in cold water. Make a second dip if desired. To remove from the form, prick a pinhole through the end to admit air, and twist off. By warming slightly, these shells may be modeled into the form of the crowns desired by using ball-end instruments to "bulge" out the sides to get a proper tooth-form. The usual procedure is to take an impression and bite with the band in place on the root. Remove the band and fit it accurately in its place in the impression, put a thin film of wax on the inside of the band, and proceed to pour the plaster to make articulating models in the usual way. When the plaster is hard warm the band, and it may be easily removed. Clear it of the wax from the inside and replace it on the plaster model. This is done to insure its easy removal after the wax shell is fitted to it, so that it will come away with the latter when desired. Then the wax shell is adjusted, sealed to the band with a warm instrument, and the shell is modeled to fit the space and to afford proper contact with the adjoining teeth. In doing this, the wax should be warm enough to be moderately pli-

able. Then when ready, chill the wax model, and warm the occlusal surface only sufficiently to take the bite of the occluding teeth, which is done, of course, by closing the articulator. With the articulator closed, trim away any surplus wax, attend to any modeling that should be done with the teeth closed, then open and finish the modeling of the cusps as may be indicated by the bite. With a bit of cotton and vaselin smooth and polish all surfaces just as the finished gold is desired, and see that the wax laps on and adheres to the band; then chill and remove it from the articulator and smooth the attachment to the band on the inside.—R. B. TULLER, *Amer. Dental Journal*.

The X Ray in Dentistry.—Dr. G. J. Goldie, in connection with a paper read before the Odonto-Chirurgical Society of Scotland, showed nearly 100 skiagrams demonstrating the more obvious conditions in which the X rays are of value in dentistry, as follows:

(1) Fracture of the jaw. In fracture of the mandible he demonstrated the importance of (a) diagnosing the condition of the teeth as such after the bony fracture; (b) their relation to the seat of lesion as bearing on treatment of retention if undamaged, or (c) extraction if splintered; (d) the possibility of their being caught between the fractured portions and so preventing reduction of the fracture, etc.

(2) Fracture and dislocation of the teeth in the jaw. These slides demonstrated (a) fractures of the root caused by violence, and (b) dislocation of teeth from their sockets without being actually dislodged.

(3) The diagnosis of inflammation round the roots of teeth—alveolar abscess. Abscess in its varying forms was here shown—(a) circumscribed abscess; (b) diffuse abscess; (c) abscess involving more roots than one; (d) abscess in relation to the nose; (e) abscess in relation to the antrum of Highmore.

(4) The diagnosis of inflammation giving rise to symptoms remote from the seat of lesion, as neuralgia, trismus, etc. These were mainly obscure inflammations of long standing, and were interesting as being impossible to demonstrate except by X rays.

(5) The treatment of impacted and incoming third molars (a) as the cause of neuralgic conditions, and (b) in point of treatment—extraction, etc.

(6) The normal eruption of the permanent teeth following their deciduous predecessors.

(7) Abnormal eruption of the same.

(8) The absence or presence of any given tooth in the body of the jaw when its eruption

has been abnormally delayed. The teeth here demonstrated as being often incarcerated—the third molar excepted—were the canine and second bicuspids. One of the points brought out was the retention of the second deciduous molar well into adult life, and several interesting skiagrams were shown in which this tooth had no permanent successor. In some cases the roots of these deciduous teeth were seen to be undergoing absorption, and in others not.

(9) Orthodontia.

(10) Many purely clinical dental conditions and applications.

(11) Foreign bodies in the antrum of Highmore. Incarcerated teeth. Dr. Goldie drew attention to the fact that while the bony antrum of Highmore could be demonstrated by X rays, its membranous lining could not, and that this formed a serious obstacle in the diagnosis of empyema by skiagraphy.

(12) Pulp-stones and calcification of the pulp.

(13) Pyorrhea alveolaris—(a) simple and (b) complex. These slides illustrated—(a) Simple—progress of pyorrhea alveolaris from its beginning as an absorption of interdental bone on the gingival margin until the entire socket had been destroyed; (b) Complex—with ordinary dento-alveolar abscess.

(14) Tic douloureux—condensing osteitis, (a) due to impacted and supernumerary teeth; (b) due to condensing osteitis, simulating painful cicatrix in soft tissues, strangulating the sensory nerve fiber.

(15) Malignant tumor.

(16) Exostosis.—*Dental Record*.

A Simple Method of Replacing a Pin Crown When the Root has Decayed.—It sometimes happens that a patient comes to consult us about a crown which has become loose, and on examination we find to our discomfort that not only has the crown become loose, but also that a considerable portion of the root has decayed underneath the base-plate. I have thought of a very simple method of restoring the decayed portion, still utilizing the original crown.

In the first place, it is necessary to dress away the gum which has grown into the space caused by the decaying of the root. This can be most successfully done with cotton and sandarac varnish. Then a piece of gutta-percha is heated and pressed round the pin of the crown. After further heating the gutta-percha, the crown is pressed into its original position, and left till the gutta-percha is hard. After removal, the gutta-percha is trimmed up with a hot knife. This is a simple matter, as the gutta-percha takes a

very sharp impression of the dimensions of the root. Simple as it is, it must be most carefully done, for the after-fit depends in a large measure on this part of the process.

A plaster cast is now taken of this impression, carefully trimming it down to the base-plate. When the plaster has thoroughly set, the cast is heated sufficiently to permit of the removal of the crown and gutta-percha together. After their removal, further heat is necessary to drive out all moisture from the cast. In the meantime, the pin of the crown has been thoroughly cleaned, roughened, and heated, along with the plaster cast. Fusible metal is then poured into the space left by the removal of the crown and gutta-percha. The heated crown is then replaced with considerable force to insure that it has been sent home perfectly. On removal, after cooling, the fusible metal will be found adhering to the pin of the crown, giving a sharp replica of the gutta-percha. On replacing the crown it will be found to fit perfectly into all the irregularities of the root. In this way a stronger and more efficient piece of work is obtained than can be acquired by means of building on to the root itself. Another condition in which this method may be employed is when a root has decayed very much under the surface of the gum. The gum is dressed away in the usual manner, and a rough impression taken. The crown is fitted so that the labial portion is in proper position, and finished. No great care need be taken of the distal or lingual aspect of the base, beyond the fact that it at least touches the gum in that position. From this point on the procedure is the same as in the former case.—J. G. S. ANGUS, *Dental Record*.

Duplicating Plaster Models.—Exact duplicates of original models are often desirable as die models, for fitting clasps, or in orthodontia work. In pouring a model from the impression no salt should be added to the plaster or impression compound. Marble cement is preferable at all events. It is also advisable to fix pins in the grooves made by the individual teeth left standing, in order to avoid breaking of the teeth on the model or to have a guide for cementing them on, if they happen to be broken. For duplicating a model the same amount of black rubber as used in taking an impression is softened in water just below boiling-point, and the model to be duplicated is laid in cold water. Then the tray fitting upon the model is filled with the rubber, and after having been left in the water for about five minutes the model is pressed into the rubber, reversed, and ballasted with a heavy object, hammer, big tongs, or the like, in order to prevent the rubber from separating from the model. After from ten to fifteen minutes the model is separated from the rubber, and if it has not been distorted, the second model is poured. In order to separate this model from the rubber, it is laid in water slightly below boiling-point for a few minutes. The second model may be tested as to its exactness by making a compound impression of the first model and examining its fit on the duplicate model. It is essential that the rubber be handled with wet hands, since it sticks otherwise, and that the first model be immersed in cold water for some time. After having been cleaned of any adhering plaster, the rubber can be used again; no boiling water must be used.—OTTO CASSNER, *Pawels' Zahntechnische Reform*.

HINTS, QUERIES, AND COMMENTS.

HONE YOUR HYPODERMIC NEEDLE.

Do so before using it, at every operation. Why? The needle can be inserted with much less pain. The needle corrodes more at the point; honing will remove any corrosion present, and minimize the liability to infection. The gum will heal better after the operation, and the little red spot which often shows, long after the tooth has been extracted, at the point

where the needle has been inserted, will not appear. Use a small Arkansas stone and draw it several times toward the point in the line of the bevel.

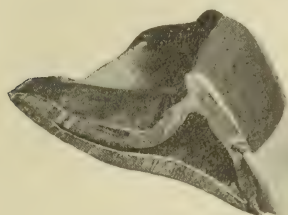
The chief advantage of honing is that there is much less pain on inserting the needle, and you will not hear the remark which is so often made: "Putting in the needle was worse than the pulling."

R. M. BRIGHT.

Paducah, Ky.

A HOLLOW RUBBER PLATE.

SEVERAL years ago I was asked if I could make a set of teeth that would show (!) for an old lady who, much to my surprise, fished out of the upper region of her oral cavity a plate which only the X rays could have disclosed. I made a thick plate in the usual way; the teeth showed, but her tongue was lost in space (a serious handicap even for a woman of eighty summers). The case was one of extreme absorption, especially at the anterior ridge, with a very long lip.



I then constructed the hollow plate illustrated, which was a success, the patient learning to enunciate after a week or two. Her features were much improved. There was no porosity as frequently found in thick plates, and the construction of the secondary lingual arch required no more work than the patching of a broken plate.

Procedure. Make a plate without any regard to smoothness of the lingual surface, vulcanize it hard, then scrape or bur the surface over the pins and closely up to the teeth, also across the heel. Warm a piece of wax, press it into the palatal surface, carve it to suit, and flask the plate as for patching. After removing the wax, clean the burred surface with chloroform; then cut a piece of rubber of sufficient size to bridge over the arch. Place three or four drops of water in the plate; warm the rubber, and seal it carefully all around the edge. Place the plate in the vulcanizer with the arch down, in order that gravitation may assist in assuring conformity to the lingual

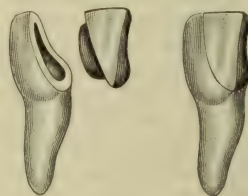
surface. The drops of water sealed in will generate steam, producing a hollow plate. The plate illustrated was immersed in water for three days before it was sawed open, and was found to be perfectly dry inside.

FREDERIC H. BROWN.

Lebanon, N. H.

TOOTH CONTOURED WITH A GOLD CASTING UPON A PORCELAIN FACING CUT OUT OF A PORCELAIN TOOTH.

AFTER removing all caries from the tooth to be contoured, take a carborundum disk and cut down and away all broken-down enamel, until a perfectly shaped edge without flaws or pits is secured, which is done by running the edge of the disk against the tooth diagonally. After the tooth is prepared, cut a porcelain facing out of a pinless tooth, which is done in a few minutes, and shape it so as to fit the tooth to be contoured, which



is readily done by running the side of the disk against the edge which is to fit the tooth; also cut with the disk dovetail grooves on the back of the facing, so as to give it a firm hold in the casting. Then mount the facing on the tooth with inlay wax, remove and invest it in the usual manner, and cast with gold or any other suitable metal. This makes a very artistic and substantial inlay.

T. W. CROZIER.

Christiansburg, Va.

OBITUARY.

DR. WILLIAM S. HUBER.

DIED, from apoplexy, at his home, 823 Cumberland st., Lebanon, Pa., May 25, 1909, Dr. WILLIAM S. HUBER, M.D., D.D.S.

His prominence in his profession, his wide interest in business affairs, and the high esteem in which he was held by people in all walks of life, make the demise of Dr. W. S. Huber a source of deep regret to his community and to the dental profession alike.

William S. Huber was the son and only child of Dr. William A. Huber, who was a leading dentist in Lebanon for many years. His early education was secured at the public schools of Lebanon, Dr. Huber being graduated from the Lebanon high school. Having decided to become a physician, he attended the University of Pennsylvania, completing the course in medicine, which he followed by taking a full course in dentistry, subsequently succeeding his father in his practice. He built up a large and lucrative practice, and proved an indefatigable worker, showing his love for his profession at all times. It was his close attention and application to his professional duties which in a measure undermined his health. Possessed of rare judgment, and conservative in his large business affairs, Dr. Huber took a great interest in political life, and was elected a member of the board of public schools, also of the city councils and of select council, over which body he was presiding officer for two years. In all municipal matters he exercised the same careful, conservative judgment which marked his conduct in his own private and professional affairs.

From his boyhood Dr. Huber was identified with Salem Evangelical Lutheran church, and was elected to the board of elders, which position he held for a number of years. He was connected with all the local Masonic bodies of Lebanon, including Mt. Lebanon

Lodge, Weidle Chapter, and Hermit Commandery. He was also a member of Lu Lu Temple, Reading, and of the Harrisburg Consistory.

On April 29, 1895, Dr. Huber was married to Miss A. May Kaler. Three children were born to them, two of whom, William G. and Charles G., survive him. The death of his wife, April 19, 1901, was a severe blow to Dr. Huber, which he never fully overcame.

Interment was made at Mt. Lebanon cemetery.

DR. WILLIAM HENRY CHILSON.

DIED, in his sixty-sixth year, at his home in Appleton, Wis., from heart trouble, on April 28, 1909, Dr. WILLIAM HENRY CHILSON.

In the passing away of Dr. Chilson, the most interesting career of a well-known dentist and most highly esteemed citizen has come to its termination.

William Henry Chilson was born at Esperance, Schoharie county, N. Y., on April 1, 1844. When he was only six years of age, his parents, William and Rachel Westphal Chilson, moved to the West, settling on a prairie farm in the town of Lawrence, McHenry county, Illinois, in which vicinity his father, now ninety-three years of age, still resides. His early education, which he received in the county schools of McHenry county, was just completed when the civil war called the young man to the ranks, Dr. Chilson enlisting at Woodstock, Ill., in Company C of the 95th Illinois regiment of volunteers. He participated in the siege of Vicksburg, the Red River campaign, and the battle of Holly Springs, Miss., and after having been taken prisoner was held in the Andersonville prison, whence he was discharged on his twenty-first birthday, April 1, 1865.

Before enlisting, Dr. Chilson had done a little work in a dental office, and upon his

return he resumed his studies in the office of Dr. F. S. Brainard of Harvard, Ill. After having attained sufficient proficiency in his chosen profession, he in the spring of 1867 established himself as dental practitioner in Jefferson, Wis., whence in 1875 he moved to Appleton, Wis., where he practiced until his death.

Dr. Chilson was ranked very highly as a dentist not only by his fellow citizens but throughout the state. In 1875 he became a member of the Wisconsin State Dental Society, of which in 1900 he was elected a life member. From 1876 to 1878 he was acting president of that society, and in 1888 was re-elected to the same office. In 1894 he was chosen chairman of the committee to amend its constitution and by-laws. It was through his efforts that the Fox River Valley Dental Society was organized, in 1904, of which he was elected first president and with whose success he has since been most eminently identified.

Not only was Dr. Chilson prominent in his profession, but, broad-minded and possessing splendid judgment, his counsel was frequently solicited and his influence was felt in many of the public affairs of his city. For a number of years he was a member of the first ward school board, also of the board of trustees of the Congregational church.

Dr. Chilson possessed a large dental library and a uniquely rare and complete collection of books on the war, histories of the battles, and anecdotes of interest to veterans and their families. Together with these he had a rich collection of war relics, and several interesting and important original documents, papers, and manuscripts.

He was married November 7, 1868, at Lake Mills, Wis., to Grace Edith Winans, who survives him, together with one daughter and two sons—Mrs. E. L. Ohrman, Thad Chilson of La Crosse, manager of a branch dental depot, and Lee Chilson, D.D.S., formerly of Winslow, Ariz., who has now taken up his father's practice.

Interment was made from the Congregational church at Riverside Cemetery, the pallbearers being selected from the several fraternal organizations to which the deceased had for years belonged, from the ranks of the veterans, from the dental profession, and from his many friends.

DR. MYRON B. SHUMAN.

DIED, in his twenty-seventh year, at his home in Reading, Pa., of diphtheria, on Tuesday, May 25, MYRON B. SHUMAN, D.D.S.

Death has claimed one of the most popular dentists in Reading, Pa., Dr. M. B. Shuman, prematurely terminating a young life giving fair promise of an excellent future.

Dr. Shuman received his early education in the Mainville and Bloomsburg public schools. Later he attended the Bloomsburg normal school, and in 1900 matriculated as a student in the dental department of the University of Pennsylvania, from which he was graduated with the class of 1903.

The deceased was a member of the Pennsylvania State Dental Society, the Reading Dental Society, the Lebanon Valley Dental Association, the Berks County Alumni of the University of Pennsylvania, also of the Meadowbrook Country Club, the Masons, and of Rajah Temple, Nobles of the Mystic Shrine.

Interment was made at the deceased's former home in Bloomsburg, Pa.

At a meeting of the Lebanon Valley Dental Association the following resolutions of regret were passed upon the death of Dr. Shuman:

Whereas, An all-wise Providence has seen fit to remove from our midst, in the morning of life and in the promising period of his professional career, our esteemed fellow member Dr. M. B. Shuman; and

Whereas, His professional zeal and devotion to our organization was shown by his presence at the opening hour of our late meeting, notwithstanding that he was already ill with the fatal disease, necessitating his withdrawal before adjournment; therefore be it

RESOLVED, That in the death of Dr. M. B. Shuman the Lebanon Valley Dental Association loses a beloved member, whose brightness and geniality commended him to all, and whose absence will cast a shadow upon our future gatherings; and further

RESOLVED, That these resolutions be spread upon the minutes of our society, and that a copy be sent to the bereaved parents and family of our departed brother, also to the dental journals for publication.

C. R. SCHOLL,
C. V. KRATZER,
GEO. S. SCHLEGEL,
Committee.

"IN MEMORIAM" RESOLUTIONS.**Dr. A. W. Harlan.**

At a meeting of the Chicago Odontographic Society the following preamble and resolutions were adopted in testimony of its appreciation of the late Dr. A. W. Harlan as a man, and of the great value of his life-work toward the uplifting of the dental profession:

Whereas, Dr. Alison Wright Harlan departed this life on Saturday, March 6, 1909, in the city of New York:

Dr. Harlan became a member of the Chicago Dental Society in 1869, when he entered upon the practice of dentistry in Chicago. He attended the Ohio College of Dental Surgery, and was graduated from that institution in 1880. Subsequently he was graduated from the College of Physicians and Surgeons, Chicago. He received the degree of Master of Arts from Dartmouth College. He was deeply interested in all that pertained to the advancement of his profession. He was well known in dental literature as the founder and editor of the *Dental Review*, and was always interested in dental educational work. He assisted in founding the Chicago College of Dental Surgery and was its professor of materia medica and therapeutics from 1883 to 1904. He held a professorship in the College of Physicians and Surgeons in Chicago. He was one of the most enthusiastic workers in the legislature in the passing of the bill which became a law in 1881, and was on the floor of the house at the time it was passed. He was a member of the first board of dental examiners.

It was Dr. Harlan who first proposed the holding of the International Columbian Exposition, in an article which he wrote twelve

years prior to its realization, in which article he also proposed the holding of the Second International Dental Congress, of which congress he was the secretary-general. He was one of the organizers and an original member of the International Dental Federation, and was also a delegate to the Medical Congress held in Madrid in 1903.

Dr. Harlan was a prolific writer, a careful and conscientious teacher, and his interest in the society work of the dental profession was perennially active. His writings related to questions of pathology, materia medica, and therapeutics. Dr. Harlan's papers were characterized by careful investigation and a thorough familiarity with the literature of the subjects upon which he wrote. He was always willing to contribute to the work of any society the best of his knowledge. He attended every meeting of the International Dental Federation from the time it was founded in 1900 until last year. He was a member of the American Dental Society of Europe, and of the city and state societies of nearly every state in the Union. Be it therefore

RESOLVED, That in the death of Dr. Alison Wright Harlan the dental profession has lost one of its most able members.

RESOLVED, That the Chicago Odontographic Society will ever remember with gratitude his devotion to its advancement to a high place among the professional organizations of our country.

RESOLVED, That these resolutions be spread upon the minutes of the meeting of this society, and that a copy be sent to the dental journals for publication.

TRUMAN W. BROPHY,
C. N. JOHNSON,
E. NOYES,

Committee.

DENTAL COLLEGE COMMENCEMENTS.

UNIVERSITY COLLEGE OF MEDICINE, DENTAL DEPARTMENT.

The commencement exercises of the University College of Medicine, Dental Department, were held in the Academy of Music, Richmond, Va., May 18, 1909.

Addresses were delivered by the president, Dr. Stuart McGuire, and Hon. J. D. Eggleston, Jr.

The degree of Doctor of Dental Surgery was conferred on the following graduates:

L. E. Dellinger
J. M. Gardner

R. H. Jeffries
Will Parker

F. F. Rangeley
W. E. Robertson

T. H. Scales
I. H. Wills

MEHARRY DENTAL COLLEGE.

THE annual commencement exercises of the Meharry Dental College, Nashville, were held April 8, 1909.

An address to the graduates was delivered by Rev. J. W. E. Bowen, D.D.

The degree of Doctor of Dental Surgery was conferred on the following graduates:

J. J. Bell	Georgia	J. S. Johnson	Georgia
H. L. Boston	South Carolina	J. A. Napier	Tennessee
D. H. Brown	Georgia	J. C. Overton	Tennessee
C. S. Carr	Georgia	Z. G. Pusey	Colombia, S. A.
C. A. Dunston	North Carolina	T. J. Randolph	Oklahoma
C. F. Hoskins	Georgia	J. C. Shoffner	Tennessee
William Howard	Louisiana	A. S. Staley	Georgia
Andrew Hudson	Oklahoma	U. S. Walton	Tennessee
A. S. Hunter	North Carolina	W. S. Yarbrough	Tennessee
C. B. Johnson	Texas		

COLLEGE OF DENTAL AND ORAL SURGERY OF NEW YORK.

THE annual commencement exercises of the College of Dental and Oral Surgery of New York were held in Mendelssohn Hall, New York city, on Monday, May 31, 1909.

An address was delivered to the graduates by Rev. Howard Duffield, D.D.

The degree of Doctor of Dental Surgery was conferred by Mr. Clarkson Cowl on the following graduates:

Rudolph William Auspitz	Austria	Louis Lerner	New York
Walter Everett Burns	New York	Arthur William Lewis	New York
Lewis Henry Carr	New York	Bernard Lunenfeld	New York
Frank Leslie Chambers	New York	Eleanor Martineau McKeever	New Jersey
Leisor Cigal	Russia	Mathew Francis McPhillips	New York
Gertrude Elizabeth Curtis	Pennsylvania	Alfred Hammond Pierson	New Jersey
Charles Alexander DeCamp	Connecticut	Joseph Rosenblume	New York
Gilel Eliowicz	Russia	Maurice Frederick Rothenberg	New York
David Goldman	New York	Esther Schneider	New York
Abraham Isaac Gordon	Russia	David Schoen	New York
Max Waldo Grosberg	Connecticut	Herman Nathaniel Schektman	New York
Rose Hall	Russia	Alexander Leslie Singer	New York
Ida Klupt Hermann	Russia	George Gonner Starke	New York
Rebecca Horwitt	New Jersey	Ferdinand Alfonso Sterling	New York
Julia Anna Klein	Russia	Floyd Edward Williams	Massachusetts
Joseph John Koob	Germany	George Henry Wright	New York
Benjamin Kreisberg	New York	Ralph Ernest Yoder	New York
Isidore Kunstler	New York		

WESTERN RESERVE UNIVERSITY, DENTAL SCHOOL.

THE sixteenth annual commencement exercises of Western Reserve University, Dental School, were held on Thursday, June 17, 1909, in the Beckwith Memorial Presbyterian Church, Cleveland, Ohio.

An address was delivered by Harry Pratt Judson, president of the University of Chicago.

The degree of Doctor of Dental Surgery was conferred on the following graduates:

Lloyd Wilbur Bentley	Louis James Jackman	William B. Nightingale
Charles Stephen Blough	Charles John Kampfe	Ward Ansel Richardson
Frank Cornelius Campbell	Julius Gerhardt Lindhorst	Israel S. Rubin
Glenn DeWitt Fletcher	James Blaine Mohler	Earl Fall Snodgrass
William Henry Harrison	Carl Theodore Nick	Daniel Stough Teters
Charles Henry Hasse		

NEW YORK COLLEGE OF DENTISTRY.

THE forty-third annual commencement exercises of the New York College of Dentistry were held on Tuesday evening, June 1, 1909, in Carnegie Hall, New York city.

The address to the graduates was delivered by Rev. S. Parkes Cadman, D.D.

The degree of Doctor of Dental Surgery was conferred by Rev. George Alexander, D.D., on the following graduates:

David Maurice Arkin	New York	Leon Labin	New York
Jacob Asch	New York	Robert George Levine	New York
Adolph Berger	New York	Samuel Levitch	New York
Henry Blum	New York	Jacob Oscar Lifshitz	New York
Hans Both	New York	Elmer Alvin Lindsay	New York
Arthur Herriot Boughton	New Jersey	Emanuel London	New York
David Konstant Browd	New York	Benjamin Jacob Lustgarten	New York
Milton Phoebus Bruckheimer	New York	Fred Miller	New York
Roger Chauncey Brush	New York	Morris Louis Osofs	New York
Frank Edward Bugden	New York	Ray Sutherland Palmer	New York
Joseph Maxwell Cohen	New York	James Bolton Pentz	New York
John Arthur Corcoran	New York	John Louis Peters	New York
Max Hillel Feldman	New York	John Rachlin	New York
Morris Henry Feldman	New York	Max Ritter	New York
Frank Finkelstein	New Jersey	Morris Rosenblatt	New York
Sigmund Walter A. Franken	New York	Jacob Bernard Schneer	New York
Jacque Fraunhar	New York	Jacob Schwarz	New York
Jacob Edward Goldin	New Jersey	Heinrich Schweitzer	New York
Aaron Goldman	New York	Harrison Vance Scudder	New York
Jacob William Goldstein	New York	Benjamin David Shapiro	New York
Myron Greenberg	New York	Samuel Sheff	New York
Jacob Greenstein	New York	Alexandre Singher	New York
Jacob Grossman	New York	Samuel George Smorack	New York
David Germain Haight	New York	Nathan Sobelman	New York
Sigmund Sidney Haimowitz	New York	Nathan Meyer Stavisky	New York
Jacob Hermann	New York	Martin Steinberg	New York
William Lambert Hildebrant	New Jersey	Arthur Clifford Walker	New Jersey
Paul Hochberg	New York	Eugene Weissmann	New York
Solomon Horwitz	New York	William Henry Wolff	New York
Harry Mortimer Kaufman	New Jersey	Joel Michael Zametkin	New York
William Henry Kerr	New Jersey		

PITTSBURG DENTAL COLLEGE.

THE commencement exercises of the Pittsburg Dental College were held Wednesday, June 9, 1909, in the Carnegie Music Hall, Pittsburg, Pa.

The degree of Doctor of Dental Surgery was conferred on the following graduates:

Raymond Vincent Acken	Frank Alphonsus Gallagher	Max Neil
William John Barto	James Roy Guffey	Pauline Nieman
Joseph Francis Campbell	Frank Cree Horner	Bruce P. Rial
Edgar Martin Craig	Florence Ivory	Alfred Ries
Charles Sol Cuden	Herbert Stifel Kison	Ernest Ray Roberts
Harry Allen Curtis	Gaetano La Rosa	Homer Carroll Roe
Elwood Joseph Delozier	Leo Thomas Little	Roy Rumbaugh
Earl McBride Donaldson	Harry Curtiss Lovell	Paul Nevin Sluth
Samuel Judson Ervin	James H. Reed McCampbell	Jesse David Sedgwick
Omer Stewart Ferren	Charles Everett Manon	William James Sweeney
Samuel Fierstone	Louis Brenton Moore	John Oscar Thomas
Frank Todd Folsom	Joseph Michael Moran	James Garfield Wick
James Bruce Frazer	William Elliott Myers	

CHICAGO COLLEGE OF DENTAL SURGERY.

THE twenty-seventh annual commencement exercises of the Chicago College of Dental Surgery were held in the Garrick Theater, Tuesday, June 1, 1909.

Addresses were delivered by Hon. P. H. O'Donnell, J. P. Buckley, D.D.S., and Louis P. Cain, D.D.

The degree of Doctor of Dental Surgery was conferred by Truman W. Brophy, M.D., D.D.S., LL.D., on the following graduates:

Chas. F. Alexander	H. F. Doring	B. F. Johanson	E. F. Reischaeur
Emil A. Anderson	John S. Dreher	I. Chester Kintzer	J. A. Rilling
Olaf Aas Norway	J. H. Dumont	Elbert W. King	Julius P. Roslyn
H. G. W. Ball	C. Eitingon	J. L. Key	Percy Rutterford
Joe E. Bennett	W. A. Erickson	R. G. Knoff	Wm. B. Ruddick
C. A. Biermann	J. M. Everly	C. Lane	A. L. Rennie
Fayette Biglow	Fred R. Felcher	Adelard J. Lemieux	G. W. Sherman
R. J. Blake	T. Fukui	C. H. Lowe	Geo. W. Smith
Bernard Bramm	J. P. Garriott	Ralston I. Lewis	Maurice Straubbe
E. E. Breaks	B. Gawron	Evert J. D. Lorgion	E. I. Stewart
Emit Browning	Jas P. Gorman	Frank E. Ling	J. D. Stockwell
A. D. Burne	J. E. Gorden	W. B. Lawrence	Thomas E. Turner
E. O. Cain	Thomas Goldberg	O. J. Monson	C. M. Turman
J. H. Calhoun	O. A. Goldstein	K. Miner	E. G. Vance
Marshall G. Cary	Winfred E. Henshaw	W. G. Mitchell	A. D. Vance
J. Cottard	C. S. Helm	W. H. Murray	Carl Vansant
E. L. Cox	Harvey H. Hoy	Jacob L. Neymark	Verner W. Watt
Ernest B. Croxen	L. L. Hopkins	Clarence N. Newlin	Glenn P. Walker
C. W. Currie	Scott W. Hoyt	James H. Pearce	Seely C. Wood
T. B. Day	Richard M. Hubeny	T. I. Robb	E. Werntz
M. Diratsonyan	A. W. Imberg	Chas. Ruff	Nathan J. Zoline

UNIVERSITY OF ILLINOIS, DENTAL DEPARTMENT.

THE eighth annual commencement exercises of the University of Illinois, Dental Department, were held Friday, June 4, 1909, in Handel Hall, Chicago, Ill.

An address was delivered by Albert P. Mathews, Ph.D.

The degree of Doctor of Dental Surgery was conferred by Edmund Janes James, Ph.D., LL.D., on the following graduates:

Rose Aron	Richard F. Feick	Louis Newman
Orpha Clark Bailey	Harry W. Garnes	Elios Orlov
Paul M. Breyer	Irwin H. Halferty	Theodore William Schnell
Willard L. Brown	Henry Clifton Johnson	Julius H. Seidel
Richard Melvin Brumfield	Austin Cain Kingsley	Maitland Victor Shaver
Joseph H. Chute	Masaomi Kuninaga	Herbert Hanson Stuart
Charles James Coffey	Thorleif I. Lerche	Matthew A. Teeling
Frank L. Cooper	Dean Stanley Lewis	James E. Waterhouse
Arthur Blaine Crawford	William J. McCarthy	John Caldwell Williams
Walter W. Droberg	Theodore R. Mozee	

McGILL UNIVERSITY, DENTAL DEPARTMENT.

THE annual convocation of McGill University was held at Montreal, Canada, on June 9, 1909.

An address was delivered by Prof. C. F. Martin, B.A., M.D.

The degree of Doctor of Dental Surgery was conferred, *in absentia*, on the following graduates:

George L. Cameron Ontario	Herman O. Hills Rhode Island
Paul L. Daigneau Province of Quebec	

NORTHWESTERN UNIVERSITY, DENTAL DEPARTMENT.

THE fifty-first annual commencement exercises of the Northwestern University, Dental Department, were held at Evanston, Ill., June 9, 1909.

The commencement address was delivered by Hon. Herbert Spencer Hadley.

The degree of Doctor of Dental Surgery was conferred on the following graduates:

Albert Edward Bergquist	Roland Harry Hudson	Lucian Leo Noyes
Oscar Theodore Bergum	Ernst Carl Theodore Huttman	Thomas Guy O'Hara
Axel Bernhard	Lawrence Lafayette Innis	Sigurd Harold Ohtness
Joseph Bernstein	Gareld Bosworth Jensen	Charles Moreton Olson
Carl Louis Bertram	John Marius Jessen	Ralph Eugene Penney
George Montgomery Blair, Jr.	Sherman Peter Johnson	Leon George Phillips
George Francis Blaylock	Willard B. Johnson	Edward Rollo Pihlfeldt
Edwin Hoffman Botkin	William Fred Kallaus	Robert William Reed
Carver Rollins Brown	Morris Mayer Kerr	William Edmund Reid
Thomas Perry Bullard	Mary Elizabeth King	Evan Greene Richards
Wesley Pierson Burke	Theodore Stephen Kral	James Henry Ross
Laurence Allen Cates	Archie Clayton Laing	Oscar Sandstrom
Earle Armour Clevidence	Stanley Douglas Christy Lee	Milton Dale Schwartz
Christian John Dahle	Elmer Victor Lindberg	Cyril Sharp
Albert Victor Dallow	John Eugene Long	William Edward Snow
William Thomas Dawson	Arthur Garfield Loomis	Leonard Clay Snowden
Louis Henry DeKrauze	James Edward Lucia	William John Stiehl
Frank George Desmond	Charles Duncan McBean	G. Guy Stirling
Ernest Oscar Dietrich	Ellery Ashley McDonald	Roscoe Leaton Stout
Oscar Dietz	Edward McGovern	Corliss Samuel Toay
John Francis Dillon	Charles Weimor McKenna	Louis Llewellyn Vosper
John Kirkwood Donaldson	Augustus Arvis Marquess	Hans Walder
Michael David Donovan	Albert Roy Messick	Lee Roy Walston
Herbert Lewis Eggers	Jacob H. Miller	Charles Henry Welter
Ernst Sune Ekstrom	Arthur Reginald Mitchell	Norman Walter White
John Frederick Fietsch	Norman Lambert Mitchell	Paul George White
Paul D. Fridd	Walter Arthur Moore	Joel Osgood Wilder
Claude Reavis Hollister	Carl Victor Nickerson	Louis Clarence Winzeler

STATE UNIVERSITY OF IOWA, DENTAL DEPARTMENT.

THE forty-ninth annual commencement exercises of the State University of Iowa, Dental Department, were held in the Armory, Iowa City, Iowa, June 16, 1909.

An address was delivered by Harry Pratt Judson, LL.D.

The degree of Doctor of Dental Surgery was conferred on the following graduates:

Joseph Raymond Albright	Iowa	Jesse Phineas Irish	Colorado
Henry John Altphilisch	Iowa	Charles Henry Kelly	Iowa
George Louis Bammert	Iowa	William James McGuire	Iowa
John H. Barrick	Iowa	Harold Arthur McWilliams	Iowa
Rufus Preston Beshears	Missouri	William Francis Moravek	Iowa
Harry Garrett Bolks	Iowa	Alexander Morton	Iowa
Mathew Owen Crawford	Iowa	William Edwin Moxley	Iowa
Roy De Kruiif	Iowa	Dede Ella Mudgett	Iowa
John Donahue	Iowa	Thomas Channing Nicholas	Iowa
Peter Adolphus Eernisse	Iowa	Herbert Frederick O'Connor	Minnesota
Earl Henry Ford	Iowa	Edward William Rueppel	Iowa
William Franklin Gigray	Iowa	Clarence Francis Sangston	Iowa
Abraham J. Greiner	Iowa	Emery Schmitz	Iowa
George W. Hageman	Iowa	James Edwin Shelledy	Nebraska
Walter Charles Heers	Iowa	Sherman Ulysses Sleichter	Iowa
Fred Heiny	Iowa	Frank Alfonso Towne	Iowa
Jonathan Gennings Hinkle	Iowa	Frank Benjamin Whinery	Iowa
John Thomas Hoar	Iowa	Edward Zeithammel	Iowa

TUFTS COLLEGE DENTAL SCHOOL.

THE fifty-third annual commencement exercises of Tufts College Dental School were held in Boston, Mass., June 16, 1909.

The degree of Doctor of Dental Medicine was conferred on the following:

Alfred Tevis Blowe	Grace Chandler Emery	Harry Winfield Perkins
William Henry Boland	Joseph Nicholas Finney	Leslie Duane Priest
Nathaniel Woodbury Bragdon	Cormick Vincent Gallagher	Joseph Herbert Howard Rice
Walter Clayton Brayshaw	Ernest Willoughby Gates	Alfred Gordon Richburg
Walter Emerson Briggs	Joseph Cornelius Gethro	Catherine Agnes Rowe
Charles Joseph Burns	Charles Philip Haven	Ralph William Sawyer
LeRoy Eli Burr	Anna Veronica Hughes	Daniel Lawrence Saxton
Matthew Francis Carney	John Eugene Keefe	Roy Churchill Skinner
Earl Alvarez Carvill	Herman Leroy Keene	Harold Earle Smith
Earl Erskine Chadsey	Charles Arthur LeClair	Norman Spencer
Nathan Nason Cohen	Joseph Levy	Carl Wyman Stegmaier
Walter Edward Copithorn	Rupert Scott Lovejoy	Hyman Bernard Swig
James Elliott Cox	Frederic Archibald MacKinnon	John Francis Turner
Harold Duncan Darling	Joseph Aloysius Mahoney	Schuyler Richard Waller
John Edward Dexter	Edmund James McNally	Julius Samuel Weinstein
Andrew Francis Donlan	James Johnston McVey	Leon Jesse Wells
Edward John Donovan	Harold Eaton Mongovan	Frederick Blair Wheaton
James J. Duddy	James Francis Murphy	Charles Butler Wry
Haller Boynton Eames	Waldo Hill Murray	Leonard Deleston Young
George Washington Ellison, Jr.		

DRAKE UNIVERSITY, COLLEGE OF DENTISTRY.

THE first annual commencement exercises of Drake University, College of Dentistry, were held in the University Church Auditorium, Des Moines, on Wednesday, June 16, 1909.

The annual oration was delivered by Edwin L. Powell, D.D., of Louisville, Ky.

The degree of Doctor of Dental Surgery was conferred by the president, Hill M. Bell, A.M., LL.D., on the following graduates:

Frank Pierce Fielding Illinois | John Ball Howd Illinois

UNIVERSITY OF SOUTHERN CALIFORNIA, DENTAL DEPARTMENT.

THE twelfth annual commencement exercises of the Dental Department of the University of Southern California were held at Temple Auditorium, Los Angeles, Cal., June 17, 1909.

The degree of Doctor of Dental Surgery was conferred on the following graduates:

Clyde A. Abbott	Douglas Eads Foster	Ava B. H. Numbers
C. Fred Aschenbrenner, Jr.	L. Edna Hatcher	Naminosuke Oka
Herbert Allan Ballogh	James Laurel Howard	John P. N. Petterson
John Barr	Frank Inverarity	Xavier C. Ramirez
Fred P. S. Bolstad	Alvin Edward Johnson	John G. Sheaffer
Roy Huntley Chapin	John T. Longham	J. Horace Stewart
Glenn A. Coffield	Thomas Lynn	Kokichi Terao
Earl Adelbert Daniels	Lester Leo Meisenheimer	George W. Wessell
Louis Felsenthal	Yujiro Miyata	

Fifth International Dental Congress.

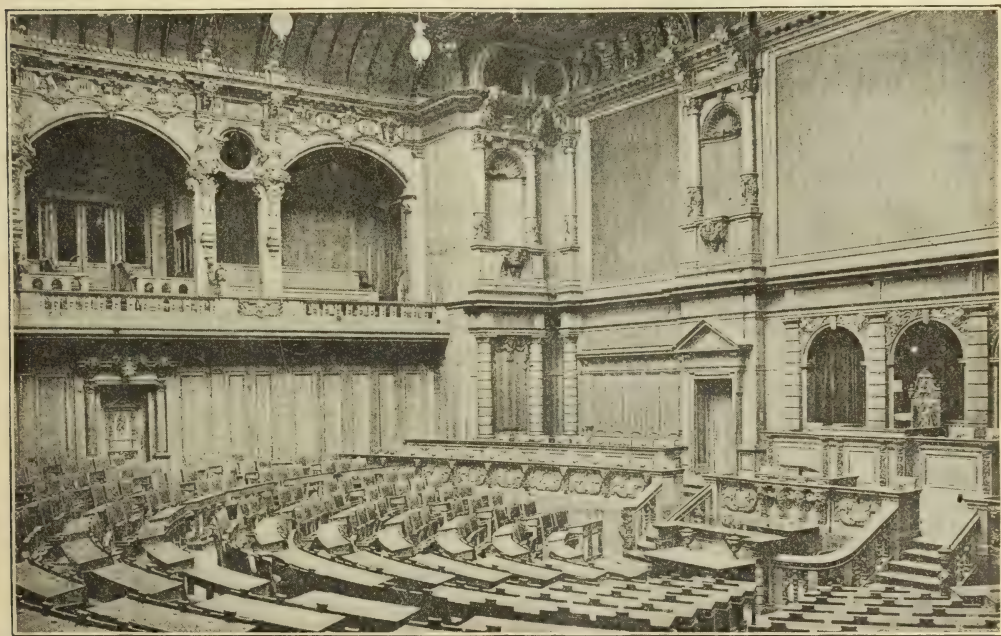
Berlin, Germany, August 23 to 28, 1909.

OFFICIAL COMMUNICATION FROM THE COMMITTEE OF ORGANIZATION.

Invitation.

TO our colleagues of all nationalities we hereby extend a hearty invitation to participate in the FIFTH INTERNATIONAL DENTAL CONGRESS, to be held

invited the congress to meet in Berlin in 1909, the German dentists were greatly pleased at the unanimous acceptance of their invitation.



GRAND ASSEMBLY-ROOM, REICHSTAG BUILDING, WHERE THE GENERAL SESSIONS OF THE CONGRESS WILL BE HELD.

in Berlin, August 23 to 28, 1909, in the Reichstag building.

When at St. Louis in the year 1904 the highly appreciated and respected Professor W. D. Miller, as president of the Central-Verein Deutscher Zahnärzte,

The congress will be coincident with the fiftieth anniversary of the Central-Verein Deutscher Zahnärzte. The united German dental profession is therefore preparing to worthily celebrate this occasion, and to make the theoretical and

practical results of this congress stand out as a landmark in the development of dental science.

Colleagues of all nations will combine, and in friendly rivalry giving and taking, learning and teaching, demonstrate to the educated world what great progress the science of dentistry has made in recent years.

Through well-attended meetings at which representatives of all nations will discuss theoretical and practical problems, dentistry will prove itself an independent science, worthy of being regarded as one of the numerous intellectual achievements of mankind.

The German Organization Committee, selected by the F. D. I., the Central-Verein, and the Vereinsbund, have completed their preparations, and now appeal to all colleagues, both at home and abroad, for their esteemed support.

The Reichstag building offers ample space for the meetings of the congress, which is divided into twelve sections. The Berlin Local Committee will do everything possible to entertain the visitors in the German metropolis during the time not occupied by more serious pursuits.

An International Dental Exhibition, to which the members are earnestly invited to contribute, will in the widest sense demonstrate the progress of our profession.

Honorary Presidents of the Congress are: Geheimer Medizinalrat Prof. Dr. Waldeyer; Wirklicher Geh. Ober-Reg.-Rat, Ministerialdirektor Dr. Naumann; Geheimer Ober-Medizinalrat Prof. Dr. Kirchner, and Geheimer Ober-Medicinalrat Dr. Dietrich of the Kultusministerium.

An Honorary Committee is also to be chosen.

The German Imperial Government has decided that the governments of the nations represented shall be officially informed of the meeting of the International Dental Congress in Berlin.

Besides the meetings of the individual sections, the congress will hold two general sessions. At these meetings time will be found not only for lecturers and demonstrations, but also for the discussion of subjects of general interest proposed by the chairmen of the sections. All progress in scientific, technical, and operative dentistry, as well as the subject and development of dental hygiene, will be presented by the ablest authorities.

A meeting of the F. D. I. will take place at the beginning and at the end of the congress.

Colleagues,—With your united support, may the great work succeed! The invitation is most heartily given by your German colleagues. With our united strength, let us guide our profession to still greater success, for the honor of science, for the benefit of mankind.

WALKOFF, *President*,
SCHAEFFER-STUCKERT,
Secretary-general,

COMMITTEE OF ORGANIZATION OF THE FIFTH
INTERNATIONAL DENTAL CONGRESS.

To the President of the National Committee of the United States of America for the Fifth International Dental Congress, Berlin, Dr. EDWARD C. KIRK, Philadelphia.

Dear Doctor,—I herewith beg to transmit through you the hearty invitation and preliminary program of the German colleagues to our American *confrères*. The Committee of Organization has been very happy to be informed of the constitution of the National Committee of the U. S. A., containing so many valuable and prominent men, and we hope that you will succeed in bringing about a participation of American dentists in the Berlin Congress as extensive as possible. We can assure you that the German colleagues will be happy to welcome their American brethren to Berlin, and that international science and international

collegiality will succeed in creating by means of this congress a work of high and important value.

To prevent misunderstandings we must explain that the Central-Verein Deutscher Zahnärzte being the body inviting to the congress, it has been necessary that all organization work and all financial and local questions shall be in charge of German graduates, but that we also heartily welcome those graduates of foreign countries residing in Germany as associate members with the same rights and privileges. I myself shall personally present the invitation to the congress to the American Dental Society of Europe at the time of their meeting in Wiesbaden, and I am convinced that the work of the congress as assisted by colleagues of all nationalities will be a great success.

Trusting to hear soon from you and awaiting with pleasant anticipations the participation of our American colleagues, I am, dear sir,

Yours truly,

SCHAEFFER-STUCKERT,
Secretary-general.

Communication from the Berlin Local Committee.

General Chairman, PROFESSOR GUTTMANN,
24 Kurfürstendamm, Berlin.

The object of the Berlin Local Committee is to make the sojourn of those visiting the congress as agreeable as possible.

In order to fully meet all requirements, the committee has decided to send out a list of questions relating to hotel accommodations, seats at the banquets and entertainments, and excursions and tours to German cities and universities. By returning the questions fully answered, at an early date, the Berlin Local Committee will be able fairly accurately to judge of the number of those intending to be present at the different entertainments, etc. This will facilitate the work of the committee and also give an opportunity of considering individual wishes.

Anyone desiring special information regarding matters within the province of the Local Committee should communicate with the general chairman, Professor Guttmann, 24 Kurfürstendamm, Berlin, or with the chairman of one of the sub-committees. So far, the following of these have been formed:

(1) *Entertainment Committee*. Chairman, Professor Guttmann, 24 Kurfürstendamm, Berlin.

(2) *Business Committee*. Chairman, Dr. Robert Richter, 23 Victoriast., Berlin.

(3) *Committee on Inspection of the Scientific Institutions*. Chairman, Dr. Ritter, 94 Königgrätzerstr., Berlin.

(4) *Press Committee*. Chairman, Markuse, 12/13 Nettelbeckstr., Berlin.

(5) *Reception Committee*. Chairman, Willmer, Gr. Lichterfelde, Jungfernstieg 3.

(6) *Ladies' Committee*. Chairman, Guttmann, 71 Alexanderstr., Berlin.

(7) *Committee to procure the necessary apparatus for Lectures and Demonstrations*. Chairman, H. J. Mamlok, 143 Kurfürstenstr., Berlin.

(8) *Committee on Hotels and Accommodations*. Chairman, Pursche, 30 Rankestr., Berlin.

The Local Committee has made an arrangement with the Hamburg-American Packet Co., by which participants in the congress will receive, except during the height of the season, a considerable reduction of rates.

The Local Committee has been able to obtain the aid of a number of colleagues living in the larger cities of Germany, who are prepared to give advice and help to strangers visiting the congress. A list of these colleagues will be sent with the question blank.

Interpreters, distinguished by a special badge, who will be pleased to give their services, will be found in the office of the congress, at the meetings, entertainments, and on the excursions.

The official reception will be held in the Reichstag building. This magnificent and impressive structure is, above all others, a worthy meeting-place for serious scientific conventions. There is a sufficient number of rooms in this building for all sections to hold meetings simultaneously. The office will be established here several weeks before the beginning of the congress. A post-office

and telephone and telegraph stations in the building will be at the disposal of participants in the congress.

The Berlin Local Committee has undertaken to entertain the visitors during the congress. Arrangements have been made, giving visitors, during the time of the congress, free admission to the Zoölogical Garden and its concerts, as well as to the Landes-Ausstellungspark and the Annual Berlin Art Exhibition.

The City Council of Berlin has graciously promised a reception in the City-hall, on Monday evening, August 23d.

A banquet will be held on August 24th, in the hall of the Zoölogical Garden, to celebrate the fiftieth anniversary of the foundation of the Central-Verein Deutscher Zahnärzte.

For Wednesday, August 25th, no special entertainment has been provided, in order to allow each visitor to spend an evening as he prefers; nevertheless, a part of the Landes-Ausstellungspark (concert garden) will be specially reserved as a meeting-place for the participants in the congress.

Thursday evening, August 26th, the official banquet of the congress, followed by a ball, will be held in the Landes-Ausstellungspark.

For Friday, August 27th, afternoon and evening, the colleagues of Berlin and the Province of Brandenburg invite the participants in the congress to be their guests. In the afternoon a fleet of steamers, specially chartered, will make a trip through the scenically beautiful Havel Lakes. In the evening a banquet will be held at the Schwedischen Pavillon in Wannsee.

On Saturday, August 28th, an Abschiedstrunk (parting cup) takes place on the Terrassen am Halensee.

Excursions will be arranged to the environs of Berlin, as well as to various German cities and universities.*

The Local Committee will arrange that places and buildings of interest, as well as scientific institutions, can be visited and inspected with competent guides.

During the meetings the committee will arrange for the entertainment of the ladies accompanying the members of the congress.

All communications and items of interest will appear in the Daily Journal of the con-

gress, edited by Dr. Konrad Cohn. The perusal of this journal is therefore strongly recommended.

To the social functions, only those having tickets will be admitted. The price of these is 12 marks.

We hereby beg all colleagues to acquaint us as early as possible with their intention to visit the congress, and to send us a notification.

It is especially wished to obtain a list of lectures and demonstrations, also the number of visitors, at an early date; we beg that all notifications be sent at your very earliest convenience.

All questions regarding the journey and accommodations should be sent to the president of the Berlin Local Committee, Professor Guttman, Berlin, Kurfürstendamm 24.

All applications for membership should be forwarded to the National Committee in your own country, or direct to the secretary-general, Schaeffer-Stuckert, D.D.S., Kettenhofweg 29, Frankfurt a. M.

All inquiries regarding the exhibition should be sent to Prof. Dr. Dieck, Potsdamerstr. 113, Villa 3, Berlin.

Further information will be gladly given by the president, the secretary-general, or the secretary, Dr. Konrad Cohn, Potsdamerstr. 46, Berlin.

SCHAEFFER-STUCKERT, *Secretary-general*,

COMMITTEE OF ORGANIZATION OF THE FIFTH
INTERNATIONAL DENTAL CONGRESS.

Regulations of the Fifth International Dental Congress.

(1) The Fifth International Dental Congress will be held in Berlin, from August 23 to 28, 1909.

(2) The congress will be devoted to the scientific and technical progress of dentistry, and to the general interests of the dental profession.

The congress is composed of the following sections:

SECTION I: Anatomy, Physiology, and Histology. *Chairman*, Dr. Adloff, Königsberg i. Pr., Weissgerberstr. 6-7.

SECTION II: Pathology and Bacteriology. *Chairman*, Prof. Dr. Römer, Strassburg i. E., Universitätsplatz 1.

* We have received an official invitation from the city council of Darmstadt, and expect similar invitations from Cologne and Frankfurt a. M.

SECTION III: Chemistry, Physics, and Metallurgy. *Chairman*, C. Birgfeld, Hamburg, Alsterdamm 1.

SECTION IV: Diagnosis and Special Therapeutics; Materia Medica: *Chairman*, Prof. Dr. Michel, Würzburg, Wilhelmstr. 3.

SECTION V: Oral Surgery and Surgical Prosthesis. *Chairman*, Geheimrat Prof. Dr. Partsch, Breslau, Kaiser-Wilhelmstr. 3; Prof. Dr. Schröder, Berlin, Rankestr. 27.

SECTION VI: General and Local Anesthesia. *Chairman*, University Lecturer Dr. Fischer, Greifswald.

SECTION VII: Operative Dentistry. *Chairman*, Prof. Dr. Sachs, Berlin, Kurfürstendamm 247.

SECTION VIII: Prosthetic Dentistry, including Crown and Bridge Work; Ceramics. *Chairman*, Prof. Dr. Riegner, Breslau, Museumstr. 11.

SECTION IX: Orthodontia. *Chairman*, Hofzahnarzt Heydenhauss, M.D., Berlin, Potsdamerstr. 121a.

SECTION X: Hygiene of the Mouth and Teeth. *Chairman*, Hofrat Dr. C. Röse, Dresden, Daheimstr. 12.

SECTION XI: Education and Legislation. *Chairman*, Dr. Ritter, Berlin, Königgrätzerstr. 94.

SECTION XII: History and Literature. *Chairman*, University Lecturer Dr. Hoffendahl, Berlin, Schöneberger Ufer 20.

(3) "Ordinary members" of the congress are: Graduated dentists, who possess the diploma of the country in which they practice, and instructors of dentistry in universities. "Associate members" of the congress are: (a) Physicians; (b) foreigners, who do not possess the diploma of the country in which they reside. (The eligibility of persons not here provided for will be decided by the national committees; for Germany, by the Committee of Organization.) "Participants" are relatives of the members of the congress, and students of dentistry. Ordinary and associate members have equal rights.

(4) Applications for membership are to be sent to the national committees (in Germany, to the Organization Committee), together with name and address, and the fee of 25

marks. For relatives of the members of the congress, as well as for students, the charge for admission cards will be 10 marks.

(5) For admittance to the congress, a card bearing the name of the member, as well as a receipt for the dues paid, is necessary.

Visitors at the congress will receive the Daily Journal of the congress and the catalog of the exhibition. Ordinary and associate members receive the Transactions of the Congress, gratis.

Lectures and demonstrations can be given by members only.

(6) The congress will convene in the Reichstag building.

(7) German, English, and French are the official languages of the congress; other languages may be used with the consent of the chairman of the section.

(8) The congress will hold a general opening session (Monday, August 23, 1909), a general session (Thursday, August 26th), and a closing session (Saturday, August 28th). There will be sessions of individual sections, as well as meetings of several sections together. Discussions will not take place at the opening session.

(9) Those wishing to give lectures, demonstrations, etc., should notify the chairman of the section, before May 15, 1909. Notices sent in after that date can be considered only after the program has been arranged. Should circumstances permit of more papers being read, the chairman has a right to select from those sent in after May 15th. It is advisable to let the national committees send in all contributions, etc., to the chairmen of the different sections.

(10) All lectures, etc., are to be delivered ready for printing in the language in which they are to be given, with a summary of the most important points, to the chairman of the section not later than June 15, 1909. This summary will be translated by the management and placed before the members of the section.

(11) Notice of practical demonstrations should be given to the chairman of the section as soon as possible, together with a list of accessories necessary for the demonstration.

A short account of the purpose of the demonstration should be sent to the chairman before June 15, 1909. This account will be translated, and communicated to the members of the congress.

(12) The time at the disposal of a lecturer is fixed at twenty minutes; five minutes will be allowed for speeches in the discussion. Extension of the time is left to the judgment of the chairman.

(13) Those taking part in the discussions should immediately note their remarks on a printed form, and give it to the secretary, if they wish their views to be published in the Transactions of the Congress.

(14) A pass for the various social functions will be issued at the price of 12 marks.

(15) There will be an International Dental Exhibition connected with the congress.

AMERICAN NATIONAL COMMITTEE FOR THE FIFTH INTERNATIONAL DENTAL CONGRESS.

At a meeting of the Executive Council of the National Dental Association held at Pittsburg, Pa., Saturday, October 10, 1908, the following were appointed as the American National Committee, to forward the work of the Fifth International Congress and provide for the representation of American dentistry at that congress—to be held in Berlin, Ger., August 23 to 28, 1909:

American National Committee.

Edward C. Kirk, Philadelphia, Pa., *Ch'man*.
 Burton Lee Thorpe, St. Louis, Mo., *Sec'y*.
 Truman W. Brophy, Chicago, Ill.
 S. H. Guilford, Philadelphia, Pa.
 B. Holly Smith, Baltimore, Md.
 G. E. Savage, Worcester, Mass.
 Wm. Carr, New York, N. Y.
 W. W. Walker, New York, N. Y.
 J. D. Patterson, Kansas City, Mo.
 Gordon White, Nashville, Tenn.
 Chas. R. Turner, Philadelphia, Pa.
 Chas. McManus, Hartford, Conn.
 G. V. I. Brown, Milwaukee, Wis.
 N. S. Hoff, Ann Arbor, Mich.
 F. E. Ball, Fargo, N. Dak.

L. P. Dotterer, Charleston, S. C.
 Eugene H. Smith, Boston, Mass.
 Chas. L. Alexander, Charlotte, N. C.

COMMITTEE ON ESSAYS.

Edward C. Kirk, *Chairman*.
 Burton Lee Thorpe, *Secretary*.
 L. P. Dotterer.

COMMITTEE ON CLINICS.

Wm. Carr, *Chairman*.
 J. D. Patterson, *Secretary*.
 Chas. L. Alexander.

All Americans who expect to attend the congress are requested to send their names, with the title of their essay or clinic, to the secretary of the American National Committee at once.

BURTON LEE THORPE, *Sec'y*.
 3605 Lindell Blvd., St. Louis, Mo.

INTERNATIONAL EXHIBITION OF DENTAL SCIENCE.

IN connection with the Fifth International Dental Congress in Berlin, August 23-28, 1909, an International Exhibition of Dental Science will be arranged, on a large scale, in the Reichstag building.

The progress of dentistry in all civilized countries cannot be better illustrated than by means of a systematically arranged scientific exhibition.

The nature and extent of the proposed exhibition is evident from the following grouping:

GROUPS OF EXHIBITS.

I. Anatomy and physiology.

1. Comparative anatomy. (a) Anthropology and ethnology. (b) Comparative odontology including paleontology. (c) Anomalies of the teeth of animals.

2. Normal macroscopical anatomy of man (anatomy and development of the head, jaws, and teeth, including specimens of the jaws and teeth).

3. Normal microscopical anatomy.

4. Anomalies of anatomical development (anomalies of the development of the head, jaws, and teeth).

5. Physiology.

II. Pathology and bacteriology.

1. General pathology.
2. Special macroscopical pathology, including comparative pathology.
3. Special microscopical pathology.
4. Bacteriology of the mouth.

III. Surgery of the mouth and the jaws.

1. Surgical therapeutics, including narcosis and local anesthesia.
2. Surgical prosthesis, including obturators.

*IV. Orthodontia.**V. Preservative treatment of the teeth.*

1. Fillings. 2. Root-treatment.

VI. Prosthetic dentistry.

1. Plate work. 2. Crown and bridge work, including ceramics.

VII. Photography in dental surgery as a means of investigation and instruction.

1. Macroscopic photography. 2. Microscopic photography. 3. Stereoscopy. 4. X-ray photography. 5. Photography in colors.

*VIII. General dental education, post-graduate instruction, educational appliances.**IX. Hygiene of the mouth and the teeth.*

- (a) From the scientific, and (b) from the sociological point of view.

X. History of dentistry.

Instruments, pictures, and in short, everything of historical interest for dentistry.

*XI. Dental jurisprudence.**XII. Literature.*

- (a) Original works. (b) Periodicals.

The committee desires to be informed of the names of all public or private collections containing specimens of general or special interest for dentistry.

The committee of the exhibition urgently requests each to use his personal influence to arouse interest in behalf of the International Dental Exhibition.

The committee will take every possible precaution to insure the safety of any specimens loaned.

Prof. Dr. DIECK,

Chairman Committee on Exhibits,
Berlin, Potsdamerstr. 113, Villa 3.

PROVISIONAL PROGRAM.

The following provisional program has been arranged:

SUNDAY, August 22d.

Meeting of the *Fédération Dentaire Internationale*. Evening: Reception of the guests at the Reichstagsgebäude.

MONDAY, August 23d.

Morning: Opening session. After the official address of welcome, four orators (German, English, French, and American) will speak on subjects chosen by themselves and important for the entire profession. The National Committees of the respective countries have each been requested to nominate their orator.

Evening: Reception given by the City of Berlin at City Hall.

TUESDAY, August 24th.

9 A.M.—2 P.M.: Sessions of the Sections.

Evening: Banquet in the halls of the Zoölogical Gardens.

WEDNESDAY, August 25th.

9 A.M.—2 P.M.: Sessions of the Sections.

Evening: Fiftieth anniversary of the *Central Verein Deutscher Zahnärzte* (Central Association of German Dentists) in the halls of the Rheingold.

THURSDAY, August 26th.

Second general session in the great hall of the Reichstagsgebäude. Subjects and questions will be discussed by speakers appointed by the different countries.

Evening—at the disposal of the congressists.

FRIDAY, August 27th.

9 A.M.—2 P.M.: Sessions of the Sections.

Evening: Reception in honor of the congressists given by the *confrères* of Berlin and of the province of Brandenburg.

Special train to Wannsee.

SATURDAY, August 28th.

9 A.M.—12 M.: Sessions of the Sections (passing of resolutions) and meeting of the *Fédération Dentaire Internationale*.

3 P.M.: Closing session. Adoption of the resolutions of the Congress.

Evening: Farewell banquet at the Halensee Terraces.

On Sunday and after, groups of the congressists will visit German cities and universities.

THE SECTIONS.

Section I.

ANATOMY, PHYSIOLOGY, AND HISTOLOGY.

Chairman, Dr. Adloff, Königsberg i. Pr., Weissgerberstr. 6-7.

This section has thus far thirty-four papers. Besides those from Germany, papers by the following gentlemen have been announced: Witthaus, D.D.S., Rotterdam; Wallisch, Vienna; Siffre, Paris; Loos, Vienna; Mahé, Paris; Haderup, Copenhagen; Christensen, Copenhagen; Cryer, Philadelphia; Sauvez, Paris; Choquet, Paris; Caush, Brighton; Gorjanowic Kramberger, Agram; Dill, Basel; Guerini, Naples; Frank, Amsterdam; Purnell, Mexico.

Of the thirty-four papers presented, six will be illustrated by means of the sciopticon.

Section II.

PATHOLOGY AND BACTERIOLOGY. *Chairman*,

Prof. Dr. Römer, Strassburg i. E., Universitätsplatz 1.

This section has thus far twenty-six papers, among them those of the following gentlemen from abroad: Hamer, Amsterdam; Van der Hoeven, The Hague; Frey, Paris; Preiswerk, Basel; Mayrhofer, Innsbruck; Bönnecken, Prague; Cavalié, Bordeaux; Quintin, Brussels; Tellier, Lyons; Sickingen, Brunn; Landgraf, Budapest; Von Stratum, Liège; Dill, Liesthal.

Section III.

CHEMISTRY, PHYSICS, AND METALLURGY; SCIENTIFIC PHOTOGRAPHY. *Chairman*, C. Birgfeld, Hamburg, Alsterdamm 1.

This section has chosen as themes for discussion—

(1) The chemical and physical properties of the more usual materials for fillings.

(2) The chemistry of the development, the nourishment, and the preservation of the hard tissues of the mouth.

(3) The utilization of electricity in dentistry.

Besides these three themes, eleven papers have been announced, including papers from abroad by—Von Dreschfeld, Manchester; Kulka, Vienna; Gassmann, Zurich.

For the theme of Section IIIA, "Roentgen Photography in Dentistry," six papers have been announced.

Section IV.

DIAGNOSIS AND SPECIAL THERAPEUTICS; MATERIA MEDICA. *Chairman*, Prof. Dr. Michel, Würzburg, Wilhelmstr. 3.

Twenty-six papers have thus far been announced, among which are a number from abroad, by the following: Von Krogh, Christiania; Trauner, Graz; Senn, Zurich; Elander, Göteborg; Merritt, New York; Wheeler, New York; Guilford, Philadelphia; Barber, Toledo; Welin, Stockholm; Bauske, Amsterdam; Francis Jean, Paris; Bouchard, Paris; Figueroa, Mexico; Clara, Mexico.

The section has also ten themes for general discussion, viz: Differential diagnosis of pyorrhea alveolaris. Diagnosis and therapy of chronic periodontitis. Diagnosis of pulpitis and periodontitis by means of the induced current. Balsam of Peru as a filling for roots. Results obtained with dentinal anesthetics. Means for preserving the pulp. Influence of oil of cloves (Eugenol) on the pulp and dentin. Differential diagnosis of the various forms of pulpitis by means of alcohol, formalin, temperature, and the induced current. Etiology and therapy of loose teeth. Diseases of the teeth and mouth as an auxiliary in the diagnosis of constitutional diseases.

Section V.

SURGERY OF THE MOUTH AND DENTO-SURGICAL PROSTHESIS. *Chairmen*, Geheimrat Prof. Dr. Partsch, Breslau, Kaiser-Wilhelmstr. 3; Prof. Dr. Schröder, Berlin, Rankestr. 27.

This section has thus far thirty-two papers. From abroad announcements have been received from the following: Weiser, Vienna; Billing, Stockholm; Schlemmer, Sr., Vienna; Trauner, Graz; Brophy, Chicago; Falero, Mexico.

The section will give demonstrations of surgical prosthesis, and will also select a number of general themes for discussion.

Section VI.

GENERAL AND LOCAL ANESTHESIA. *Chairman*, University Lecturer Dr. Fischer, Greifswald.

This section has up to the present eighteen papers. From abroad the following gentlemen have sent announcements: Carlson, Göteborg; Eckström, Göteborg; Kowarsky, Moscow; Metz, Meran; Pitot, Mons; Redard, Geneva; Wachsmann, Prague.

Three themes for discussion have also been chosen, viz:

- (1) Can dentistry dispense with general anesthesia and rely on local anesthesia?
- (2) Which form of local anesthetic is to be recommended for dentistry?
- (3) Which mode of inducing local anesthesia is the simplest and at the same time the best?

Section VII.

OPERATIVE DENTISTRY. *Chairman*, Prof. Dr. Sachs, Berlin, Kurfürstendamm 247.

For this section forty-seven papers and demonstrations have thus far been announced, of which forty will be in German, four in French, and three in English, viz: From Germany 21, Austria 3, Switzerland 5, Sweden 2, Norway 1, Denmark 3, Holland 3, Belgium 1, France 6, America 1, Russia 1. Presumably a larger number will yet be announced, especially from Austria, England, and America.

The abundant material for discussion makes necessary a strict adherence to the rules, these allowing each essayist only twenty minutes and each speaker taking part in the discussion only five minutes.

Section VIII.

PROSTHETIC DENTISTRY, INCLUDING CROWN AND BRIDGE WORK; CERAMICS. *Chairman*, Prof. Dr. Riegner, Breslau, Museumstr. 11.

Twenty-six papers from Germany have been announced, and nineteen from abroad, by the following gentlemen: Angel, Copenhagen; Bloch, Copenhagen; Amoedo, Paris; Safran, Vienna; Solbrig, Paris; Smith, Paris; Welin, Stockholm; Samuel, Stockholm; Dill, Basel; Alexander, Charlotte; Dall, Glasgow; Frank, Amsterdam; Fuyt, Utrecht; Melendy, Knoxville; Rodgers, Dorchester; Hull, Kansas City; Lombroso, Tunis; Mertens, The Hague; Occelli, Mexico.

Also four themes for discussion, viz:

- (1) Is the devitalization of the pulps of teeth supporting crowns and bridges indicated?
- (2) Under what conditions are saddle bridges justifiable?
- (3) Indications and contra-indications for permanent and removable bridges.
- (4) Do the manufactured dental products of today conform to the anatomical conditions of natural teeth?

Furthermore—chosen by the Fédération Dentaire Internationale:

Apparatus of burnished metal, and the teaching of bridge work.

Section IX.

ORTHODONTIA. *Chairman*, Hofzahnarzt Heydenhaus, M.D., Berlin, W., Potsdamerstr. 121A.

Twenty-five papers have been announced, and seven themes for discussion chosen. The following gentlemen from abroad will read papers: Andresen, Copenhagen; Elander, Göteborg; Davenport, Paris; Falero, Mexico; Jean Francis, Paris; Godon, Paris; Gomez, Mexico; Haderup, Copenhagen; Jackson, New York.

The themes for discussion are as follows:

- (1) Prophylaxis in orthodontia.
- (2) Is the classification of anomalies of occlusion, as adopted by Angle, satisfactory as a scientific system of classification with regard to the differing relations of the teeth and jaws?
- (3) Can Angle's hypothesis, that nature bestows the greatest care in placing the first molars, and in regard to the upper ones especially never errs, be accepted?

(4) What are the results of the symmetrical extraction of the first molars?

(5) In cases of previous extraction, is it necessary for preserving the result attained to reproduce the normal interspaces in the subsequent bridge work?

(6) What ages are favorable for beginning the treatment of distal occlusion on both sides (Angle, class 2, subdivisions 1 and 2)?

(7) What operative procedures are indicated in diastema of the frenulum labii?

Angle, of America, who has accepted the honorary presidency of this section, will probably take charge of the theme "Prophylaxis in orthodontia."

Section X.

HYGIENE OF THE MOUTH AND TEETH. *Chairmen*, Hofrat Dr. C. Röse, Dresden, Daheimstr. 12; and Prof. Dr. Jessen, Strassburg i. A.

Twenty-five papers have been announced, including the following essayists from abroad: Jenkins, Paris; Haderup, Copenhagen; Witthaus, Rotterdam; Lenhardtson, Stockholm; Potter, Boston; Kreusie and Woodbury, Boston; Amoedo, Paris; Cunningham, Cambridge; Guillermin, Geneva; Bensow, Göteborg; Bön, Brussels.

The Hygienic Commission of the F. D. I. in Brussels has resolved upon two proposals for submission to the congress. Further, four themes have been chosen for discussion, and at the instance of Section X the appointment is contemplated, through the Fifth International Dental Congress, of a permanent International Committee on Public Hygiene of the Mouth, to be composed of dentists, school officials, physicians, and administrative officers, so that in all countries transactions and resolutions may be productively elaborated and acted upon.

Section XI.

INSTRUCTION AND LEGISLATION. *Chairman*, Dr. Ritter, Berlin, W., Königgratzerstr. 94.

Twenty-nine papers have been announced, among which are a number from abroad, by the following gentlemen: Brun, Christiania; Preiswerk, Basel; Stoppany, Switzerland; Van der Hoeven, The Hague; Haderup, Copenhagen; Ottofy, Manila, P. I.; Bouchet, Paris; Domingo Casanovas, Santa Eulalia; Godon, Paris; Theo. Dill, Basel; Guerini, Naples; Hosley, Springfield.

In addition three themes for discussion have been announced, viz:

(1) Should the dentist have a general medical education, and what are the requirements for the state examination in dentistry in the various countries?

(2) When is it permissible to mount artificial teeth upon still existing roots? What cases are to be considered professional errors—(a) according to civil law; (b) according to criminal law?

(3) What scale of remuneration should obtain in crown and bridge work.

Besides these, the following propositions, decided upon by the Commission on Jurispru-

dence in Brussels, have been chosen for discussion:

(1) It is in the interest of all for the government to prohibit anyone from practicing dentistry who has not taken the regular course of dental instruction, and who has not a diploma authorizing him to practice.

(2) It is desirable for physicians wishing to practice dentistry to have a diploma for dentistry in addition to their medical approbation.

Section XII.

HISTORY AND LITERATURE. *Chairman*, University Lecturer Dr. Hoffendahl, Berlin, Schöneberger Ufer 20.

This section has thus far sixteen papers and three themes for discussion, the latter being as follows:

(1) How may the professional literature of all nations be rendered accessible to dentists?

(2) The arrangement of an index of the entire dental literature of the world.

(3) The preparation of the report on the scientific nomenclature of dentistry.

The work of the Berlin Local Committee for the reception festivities, etc., has progressed most favorably. By a gathering of contributions, in which several industrial firms participated in a very praiseworthy manner, the German dentists have been placed in a position to insure the reception of all their guests in a befitting manner.

The contributions to the congress by members and participants are as follows:

(1) The congress card for members, 25 marks. (Members will receive free of charge and post-paid the printed Transactions, which in view of its size and the number of illustrations, will of course be a matter of considerable expense.)

(2) The card for participants, 10 marks. (Participants are the relatives of members; also students of dentistry.) For the relatives of the members the Local Committee has arranged an extensive program of sight-seeing and entertainments (drives, excursions, etc.), free of charge, for the times at which the sessions of the congress are taking place.

(3) A coupon booklet giving the right to evening entertainments, reduced prices at the theaters, etc., will be issued at the price of 12 marks each person.

The management of the congress requests all colleagues intending to participate in the congress to send their notifications as early as possible, so that an idea of the approximate number of visitors may be gained and the necessary preparations completed.

Announcements for the congress should be directed to the secretary-general, Dr. Schaeffer-Stuckert, Frankfurt a. M., Kettenhofweg 29.

Dr. Med. KONRAD COHN, *Sec'y*,
Fifth International Dental Congress,
 Berlin, W., Potsdamerstr. 46.

SOCIETY NOTES AND ANNOUNCEMENTS.

DENTAL SOCIETY MEETINGS:

August—October.

AUGUST

FIFTH INTERNATIONAL DENTAL CONGRESS. Berlin, Germany. August 23d to 28th.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS. Old Point Comfort, Va. Three days: August 2d to 4th.

NATIONAL ASSOCIATION OF DENTAL FACULTIES. Old Point Comfort, Va. Three days: August 2d to 4th.

OCTOBER.

AMERICAN SOCIETY OF ORTHODONTISTS. Cleveland, Ohio. Three days: October 4th to 6th.

MARYLAND STATE DENTAL ASSOCIATION AND DISTRICT OF COLUMBIA DENTAL SOCIETY. Washington, D. C. Three days: October 28th to 30th.

NORTHEASTERN DENTAL ASSOCIATION. Providence, R. I. Three days: October 7th to 9th.

W. D. MILLER CLUB OF BERLIN.

At a special meeting of the W. D. Miller Club of Berlin the following resolution was adopted:

RESOLVED, That, inasmuch as the Organization Committee of the Fifth International Dental Congress has seen fit to exclude as ordinary members "graduates of dentistry who do not possess the diploma of the country in which they practice," the members of the W. D. Miller Club as a body feel that it would be more in keeping with their professional dignity to refrain from participating in this International Congress.

For the committee,

E. HAWLEY-YORK, *Hon. Sec'y*.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

THE twenty-seventh annual meeting of the National Association of Dental Examiners will be held at the Hotel Chamberlin, Old Point Comfort, Va., the first session opening at 10 o'clock A.M., Monday, August 2, 1909, and continuing during the 3d and 4th.

The result of the mail vote by the committee to ascertain the consensus of opinion as to place and date, from October 19th to the present date, was ninety-one votes for Old Point Comfort the first three days of August, thirteen for Birmingham in March, seven for Birmingham in July; the president has therefore selected Old Point Comfort.

The rates will be: American plan \$3.00 per day without bath and \$4.00 per day with bath. Large and commodious meeting-rooms will be furnished free. Railroad and steamship rates will be furnished at a later date.

CHAS. A. MEEKER, *Sec'y*,
 Newark, N. J.

NATIONAL ASSOCIATION OF DENTAL FACULTIES.

THE National Association of Dental Faculties will hold their annual meeting in connection with the National Association of Dental Examiners in the Hotel Chamberlin, Old Point Comfort, Va., August 2, 3, and 4, 1909, commencing at 10 A.M.

Rates will be the same as the National Association of Dental Examiners. Railroad and steamship rates will be given at a later date.

B. HOLLY SMITH, *Chairman Ex. Com.*,
 Baltimore, Md.

N. A. D. E. AND N. A. D. F. BANQUET.

THE first annual banquet of the National Association of Dental Examiners and the National Association of Dental Faculties will be held at the Hotel Chamberlin, Old Point Comfort, Va., either on Sunday or Monday evening, August 1st or 2d; the evening will be decided later by the committee in charge.

President Shotwell of the Examiners Association has appointed Dr. George E. Mitchell of Haverhill, Mass., Dr. Charles A. Meeker of Newark, N. J., and Dr. H. W. Campbell of Suffolk, Va.; and Dr. B. Holly Smith of Baltimore, Md., chairman of the Executive Committee of the Faculties Association, has appointed Dr. Edward W. Branagan of Boston, Mass., Dr. A. R. Starr of New York city, and Dr. F. W. Stiff of Richmond, Va., to act in conjunction in making arrangements for the success of the banquet.

CHAS. A. MEEKER, *Secy*, N. A. D. E.

ARMY DENTAL CORPS.

MEMORANDUM of changes of stations and duties of dental surgeons, U. S. army, for the month ending July 10, 1909:

Emmett J. Craig: Ordered to Fort Des Moines, Iowa, for one month, and thence to Fort Riley, Kansas, for three months.

Edward P. R. Ryan: Ordered to Fort Mackenzie, Wyo., for twenty days, and thence to Fort D. A. Russell, Wyo., for two months.

Davis S. Boak: Ordered from Vancouver Barracks, Wash., to Fort Lawton, Wash., for duty.

Hugh G. Voorhies: Relieved from duty at Fort Snelling, Minn., and ordered to Jefferson Barracks, Mo., for duty.

John R. Ames: Relieved from duty at Jefferson Barracks, Mo., and ordered to Fort Snelling, Minn., for duty.

Jean C. Whinnery: Arrived at Fort Egbert, Alaska, for duty.

Alden Carpenter: Ordered from Fort Hancock, N. J., to Fort Wadsworth, N. Y., for temporary duty.

Davis S. Boak: Detailed to represent dental corps of the army at meeting of Washington State Dental Society at Seattle, Wash., July 15 to 17, 1909.

George I. Gunkel: Ordered from Fort McPherson, Ga., to Forts Dade and DeSota, Fla., for temporary duty.

DENTAL INDEX BUREAU

UNDER THE AUSPICES OF THE

NATIONAL ASSOCIATION OF DENTAL PEDAGOGICS.

THE following matter has been issued in the form of a circular justly purporting to be "of especial interest to students, writers, publishers, editors, librarians, colleges, dental societies, etc." It is described as—

A PLAN BY WHICH SUBSCRIBERS WILL BE FURNISHED A CLASSIFIED CARD INDEX OF ARTICLES IN THE LEADING DENTAL JOURNALS.

At a meeting of the National Institute of Dental Pedagogics, held in St. Louis last December, a committee was appointed to establish a Dental Index Bureau. Briefly stated, it is intended that this committee shall employ a competent person to review and classify all of the articles in ten or twelve of our leading dental journals, and shall furnish to each of the subscribers to the Bureau, at frequent intervals, cards so classified and grouped that the subscriber may easily and quickly find all the articles on any subject in dentistry. These cards will be made on a definite system, by which additional cards may be added as they are received and always go to their proper places; so that no matter how many additions may be made from year to year, all of the cards on each subject will be in a separate group. For example, all of the articles on the subject of filling teeth with gold will be in one group, all on filling teeth with amalgam in another, all on cavity preparation in another, all on alveolar abscess in another, etc.

It is hardly necessary to mention the value of such an index to the wide-awake members of the profession. Journals which may have accumulated, and which are now almost worthless on account of the difficulty in finding articles when desired, will become of service as the index is extended to cover them. The man who has occasion to look up a particular subject, or to write a paper, can find all that has been written on that subject instantly. The grouping of articles on each subject enables one to bring together the views of many writers. Post-graduate courses of study can be instituted by dental societies or undertaken by individuals; the ready reference index will make college libraries of the greatest value to the faculty and to the student body; editors and writers will find their work facilitated, and the results of their study more gratifying to themselves and more highly appreciated by their readers.

The idea of the committee is to organize a permanent society for the purpose of classifying and indexing all dental literature. The present plan is but preliminary to the greater work, which will cost less and less to individual subscribers as the number of members is increased. Those who help to start the work will profit more than those who follow, and will have the satisfaction of participating in one of the greatest advance movements in dentistry.

The subject-matter of several of the leading dental journals has already been classified and indexed by Dr. Arthur D. Black, at a great expenditure of time and money. This index contains about 40,000 cards, cataloging articles in various journals from 1839 to date; but it is not available, for obvious reasons, to the profession at large. Your committee is privileged to copy these cards, should the funds subscribed permit, which would be of great benefit to the subscribers and incidentally to the whole profession.

It is the committee's intention to this year furnish each subscriber with author and subject cards for all original articles, papers read before societies, book reviews, and editorials, in about ten journals for 1908 and 1909—from 4000 to 5000 cards, all properly arranged with all cards for each subject together, with guide cards for each subject, and with author cards arranged alphabetically. It is expected that in 1910 the cards will be furnished for the same journals for the years 1907 and 1910; and in 1911 cards for 1906 and 1911. Thus in three years each subscriber will receive cards for these journals for six years—probably 25,000 to 30,000 cards. These cards will be sent in boxes in which they may be kept permanently. The number of journals indexed and the number of cards sent out by the committee, however, will depend upon the number of subscribers.

The preliminary report of this committee, which was made at the St. Louis meeting, gives an outline of the plan. It will be noticed that it is the intention to try this plan for a period of three years, and subscriptions at the rate of Twenty-five Dollars (\$25.00) a year for that period may be sent to any member of the committee.

Subscriptions will be received from individuals, dental journals, dental schools, or dental societies. Any person or group of persons may send in a single subscription, and one set of cards will be sent in return. Subscription blanks may be had from any member of the committee.

Committee for 1909—Dr. W. L. Fickes, *Chairman*, 6200 Penn ave., Pittsburg, Pa.;

Dr. Arthur D. Black, 31 Washington st., Chicago, Ill.; Dr. Herman Prinz, 603 Century Bldg., St. Louis, Mo.

REPORT of the Committee on Classifying and Indexing Dental Literature, to the Institute of Dental Pedagogics at the Annual Meeting, St. Louis, 1908-09.

The undersigned committee, appointed by the Institute of Dental Pedagogics for the purpose of devising ways and means of classifying and indexing current dental literature, as an evidence of progress presents to the members of the Institute and others interested the following plan:

1. That the subscribers to this plan organize themselves into an association to be known as The Dental Index Bureau.

2. That the above-mentioned committee, appointed by the Institute, will devise ways and means for carrying out the work of the Bureau during the coming year, and will call a meeting at the time and place of the next meeting of the Institute, for the perfection of a permanent organization.

3. That this committee will employ a competent person to classify as much of the current dental literature as possible, beginning with January 1909 journals, and will furnish subscribers, at frequent intervals, with author and subject cards of all articles classified.

4. That this committee will be guided by a vote of the subscribers in the selection of the literature to be classified.

5. If the funds subscribed will permit, as much as possible of the literature of previous years will be similarly classified and indexed.

W. L. FICKES, *Chairman*,
ARTHUR D. BLACK,
HERMAN PRINZ.

MARYLAND STATE DENTAL ASSOCIATION AND THE DISTRICT OF COLUMBIA DENTAL SOCIETY.

A JOINT meeting of the Maryland State Dental Association and the District of Columbia Dental Society will be held in Washington, D. C., October 28 to 30, 1909.

For further information address either of the following:

F. F. DREW,
701 Howard st., Baltimore, Md.
A. D. WEAKLEY,
Washington, D. C.

AMERICAN SOCIETY OF ORTHODONTISTS.

THE ninth annual meeting of the American Society of Orthodontists will be held in Cleveland, Ohio, on Monday, Tuesday, and Wednesday, October 4, 5, and 6, 1909.

FREDERICK C. KEMPLE, *Sec'y*,
43 W. 48th st., New York city.

NORTHEASTERN DENTAL ASSOCIATION.

THE fifteenth annual meeting of the Northeastern Dental Association will be held in the Churchill House, Angell st., Providence, R. I., on October 7, 8, and 9, 1909. The officers and committee intend this to be a very interesting and instructive meeting.

E. O. KINSMAN, *Sec'y*,
Cambridge, Mass.

HARVARD DENTAL ALUMNI ASSOCIATION.

THE following officers were elected for the ensuing year at the thirty-eighth annual meeting of the Harvard Dental Alumni Association, held in Boston, Mass., June 28, 1909: Henry A. Kelley, Portland, Me., president; Waldo E. Boardman, Boston, Mass., secretary; Harold DeW. Cross, Boston, Mass., treas-

urer. Executive Committee—Waldo E. Boardman, chairman *ex officio*, Boston; Charles E. Parkhurst (term expires 1910), Somerville, and Arthur H. Stoddard (term expires 1911), Boston. (The above-named officers constitute the Council.)

WALDO E. BOARDMAN, *Sec'y*.

EXAMINATIONS OF DENTISTS FOR THE ARMY.

THE Surgeon-general of the army announces that while there are no vacancies in the dental corps, he intends to hold examinations to establish an eligible list from which appointments will be made as vacancies occur. Applicants for appointment as dental surgeons in the United States army will be authorized to present themselves at the nearest military post at which a commissioned officer of the medical corps is stationed, for examination as to physical qualifications for employment, and those found physically qualified will be invited to report at West Point, N. Y., or San Francisco, California, about August 1909, for the professional examination. No allowance can be made for expenses incurred in undergoing these examinations.

* * * * *

Application blanks can be procured upon application to the Surgeon-general of the army.

UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING JUNE 1909.

June 1.

- No. 923,751, to GEORGE VON ACH. Apparatus for mixing and administering gases.
No. 923,752, to GEORGE VON ACH. Apparatus for holding and administering gases.

June 8.

- No. 923,946, to ALBERT C. CLARK. Fountain spittoon.
No. 924,515, to HENRY E. WEBER. Cuspidor.

June 22.

- No. 925,442, to GEORGE VON ACH. Apparatus for administering gases and vapors.
No. 925,587, to A. R. MITCHELL. Cuspidor.
No. 926,037, to FRANK W. TRACY. Apparatus for casting dental plates.

June 29.

- No. 926,583, to HENRY S. MILLER. Dental clamp.

THE DENTAL COSMOS.

VOL. LI.

SEPTEMBER 1909.

No. 9.

ORIGINAL COMMUNICATIONS.

THE BEHAVIOR OF CERTAIN METALS IN THE MOUTH.

By CLARENCE J. GRIEVES, D.D.S., Baltimore, Md.

(Read before Section I of the National Dental Association, at the annual meeting, Birmingham, Ala., March 31, 1909.)

“IT is much to be desired that the dentist should have a more definite knowledge of the behavior of metals and their alloys in the mouth; that he should make his metallurgy something not apart from, but a part of his daily practice.”

With this idea foremost, these slides and this paper are modestly offered. If a lack of sequence in the facts presented and a greater lack of knowledge as to the primary and final causes of these phenomena affecting all metals exposed in and continually wetted by a salivary and decomposing food environment as complex as it is changeable mark this effort, no apologies are made, for the slides which were obtained from many fields examined show conditions not as we wish they might be, but as they really are—conditions observable by any busy dentist in the detail of everyday practice. Several important changes in the point of view are or should be the result of re-

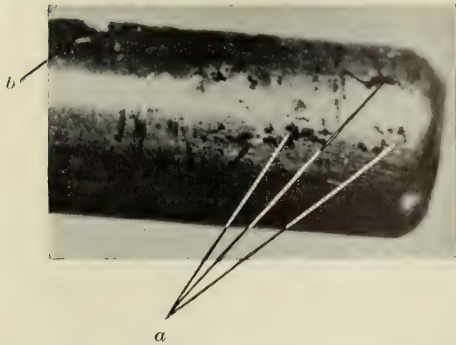
cent dental research, and not only our methods but our materials must be carefully reviewed and modified. Clinical data, physical laboratory tests of teeth and materials, and chemical analyses of saliva have shown that it is not so much a question of tooth structure, important though that may be, as of the environment of that tooth structure and of the associated operation. Prophylaxis, the product of sound pathological reasoning combined with common sense, looking not to one but to all mouth phases and lesions, has made evident and imperative perfect cleanliness for both dental and general health.

If it can be established that a vitiated saliva, or even a normal saliva and its mucous contents, or the decomposition of food in the common retention centers, or a combination of all of these, affect the metals in use in operative and prosthetic dentistry in such a way as to bring about their corrosion, forming other retention

centers to the minute but ultimate destruction of smooth surfaces, prophylaxis

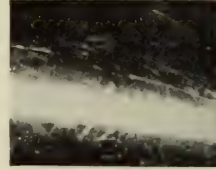
not as dangerous as its salts, yet it becomes a question of absorption of the

FIG. 1.



Section of buccal tube worn two months; 18-k. platinum gold, 5 per cent. zinc. *a*, Craters by electrolysis. *b*, Disk notch.

FIG. 2.



Section of 14-k. arch containing no zinc worn same period in same mouth, showing no disintegration.

(Figs. 1 and 2 were purposely made under the same light and lens.)

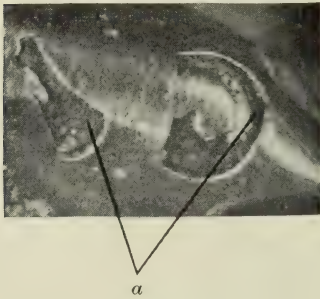
exacts of us that we correct the environment if possible, close all retention centers against the lodgment of filth, or substitute some material impervious to such

metal by the mucosa and the solubility of the salts if formed.

It would be a waste of time to name the metals employed in the mouth. If used alone a few are apparently invulnerable; many in the salivary environment degenerate rapidly; alloying, which helps the situation in producing desirable physical characteristics, increases vulnerability to such a degree as to call for definite laws for the guidance of the manufacturer. *These laws must be furnished by the dentist, who uses, is responsible for, and should dictate the type of product.*

In proof of the foregoing the following may be cited and summarized from a recent paper:*

FIG. 3.



Deep disintegration of German silver wire "dutchmen" soldered in 18-k. bridge. *a* occurred on sheltered palatal surface and were flush when set in the mouth about eighteen months ago.

action. The systemic danger from the continued ingestion of the by-products of metallic disintegration will be in direct ratio to the time of exposure and the amount of that disintegration. While noting the fact that an ingested metal is

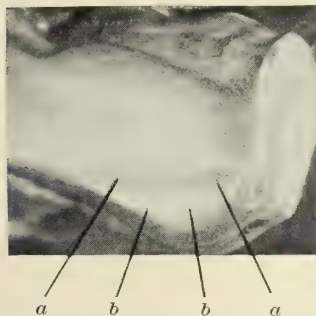
The alloy German or nickel silver was found by six assays of as many varieties manufactured to consist of copper 6.1, zinc 2.1, nickel 1.7, and iron 0.2. Exhaustive physical tests by the Bureau of Standards show this metal to be fit for all purposes in orthodontia, but it disintegrates in the saliva and hence is chemically unfit. Plain German silver examined with low powers after ex-

* "Base Metal vs. Noble Metal Appliances in Orthodontia," proceedings American Society of Orthodontists, *Items of Interest*, May 1909.

posure of a few weeks in the mouth, in child saliva, presented craters in the centers retaining food; on longer exposure these craters extended all over the appliances—an arch bar for instance—even to the parts kept clean by the lips and tongue; corrosion was more pronounced and fixed than in removable appliances, and distinctly more violent and rapid, even to perforation of the metal, when gold plating, which was always defective, occurred.

That the added layer of gold should greatly increase corrosion, even granting some damage to the alloying in plating,

FIG. 4.



Palatal view of molar bridge dummy (18-k. gold solder) worn seven months. *b*, Lower part of saddle covered by gum hypertrophy free from erosion. *a*, Line of craters in the retention center just above the false gum margin.

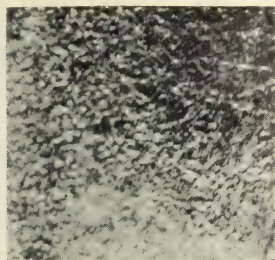
is significant when seen in the light of the table of Berzelius, gold and copper standing as highly electro-negative as opposed to nickel, zinc, and iron, which are electro-positive.

It was found that the craters were cut in the food-retention centers just as the tooth was cut, but there the analogy ceased, for to conclude that this is an acid process *per se* is to admit either that the acid starting craters extends and is retained all over the appliance, even at the constantly cleansed spots, or a general mouth acidity as high as the retention center—a position entirely untenable, for all children wearing appliances do not have hyperacid mouths, while the corrosion of German silver is remarkably constant in all mouths.

Electrolysis is, then, the principal agent working toward the destruction of this alloy, with the acids of food decomposition first charging the battery, and with the saliva containing such, as a general electrolyte. This may be further established by the following facts:

First. An alloy containing approximately gold 18, platinum 2, the remaining four parts of the 24 karats being made up of equal parts of silver, copper, and zinc, after short wear under like conditions presents corrosion almost as pro-

FIG. 5.



Greater detail of crater shown at *a*, Fig. 4.

nounced as with plain German silver. (Fig. 1.)

Second. "Dutchmen" of German silver wire used to fill in bridge dummies surrounded by gold solder and exposed in finishing, present deep degeneration spots on otherwise smooth surfaces when placed in the mouth away from the abrasion of occlusion. (Fig. 3.) German silver crown posts when soldered in gold crowns and exposed to saliva degenerate quickly.

Third. Brass (copper 2, zinc 1, approximately) buccal tubes attached to plain German silver molar anchorage bands corrode much less than the bands, owing, possibly, to the fact that while brass has copper 2, electro-negative, to zinc 1, electro-positive, German silver has copper 6.1, electro-negative, to nickel 1.7, zinc 2.1, iron 0.2, all electro-positive.

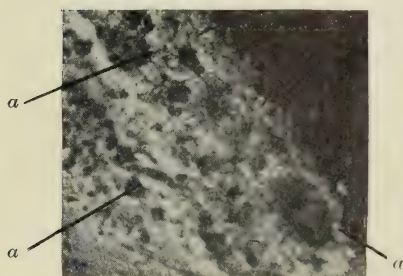
Fourth. Brass wire ligatures crossing platinous gold arch bars disintegrate

much more rapidly than when in contact with plain German silver arches in the same mouth.

Last, but by no means least, the study of a large number of 18-karat gold solder surfaces known to have been smooth when placed in the mouth by the writer, develops the interesting fact that whenever a food-retention center was created, as in saddle dummies, where gum hypertrophy has produced a false margin, corrosion exists to a marked degree. (Figs. 4 and 5.)

"Eighteen-karat" gold solders are

FIG. 6.



Degeneration of cast metal base surface in use five years. *a*, Deep pits cut in casting "faults."

really 16-karat gold, and nearly, if not all, contain approximately gold 16, copper 5, zinc 3.

It has thus been proved that German silver, with 15 per cent. zinc, 18-karat gold solder with 12 per cent. zinc, and all below such, and platinous gold alloy with 5 per cent. zinc, all corrode, with the human saliva as electrolyte, while gold plates of a much lower proportion of gold, such as coin gold (gold 90, copper 10) and the lower dental plates alloyed with metals all of the same electro-negative class as gold, with copper, silver, and platinum, do not degenerate under the same conditions. (Compare Fig. 2 with Figs. 1, 4, and 5.)

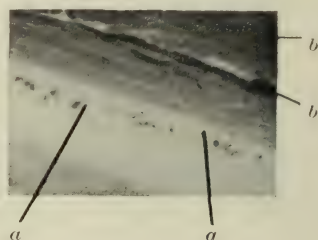
Zinc to the average extent of 5 per cent. is thus the disturbing element, and the following law may be safely deduced:

Metals violently electro-positive and negative to each other should not be used

in alloy or apposition in the human mouth, with the saliva as an electrolyte; as, for instance, gold and zinc, copper and zinc, etc.

Corollary to this law stand the facts that it is absurd to spend time polishing surfaces which we are assured will shortly become pitted; that it is bad dental and general hygiene to have such pitted surfaces in the mouth; that the degeneration waste metal is ingested continuously, producing possibly systemic detriment, and finally, that because metallic poisoning has not been generally noted, this

FIG. 7.



Deep section cut through rim of cast metal base worn three years, carrying vulcanite attachment. *a*, Deep defects in casting extending to surface. *b*, Vulcanite. *c*, Open joint between vulcanite and base.

does not in the least affirm that it has not occurred.

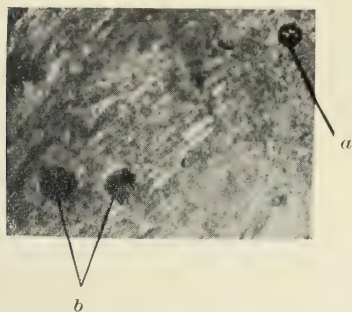
The foregoing is particularly important when applied to bridge work or dentures which are fixed or worn in the mouth for an indefinite time, the metals occurring in mass; and while there may be greater food retention about fixed bridges, the argument that a minutely corroded metal denture may be removed and cleansed is misleading, since boiling is the only means for perfectly cleansing such corroded surfaces, which reek filth immediately when they are put to use, the craters becoming deeper with consequent loss of metal.

Most vulnerable among the metallic bases used in artificial dentures are the low-fusing "cast metal bases," with or without aluminum; they are classified by

weight into those which are jarred or forced into the mold and those which displace the contained air by sheer

tween defects in casting, the metal apparently chilling in the mold (Fig. 9), blow-holes from air retained or carried

FIG. 8.



Palatal surface of cast aluminum plate worn eight months. *a*, Air bubble. *b*, Disintegrations beginning about blow-holes.

FIG. 9.



Section of cast aluminum base. *a*, Deep defects in casting.

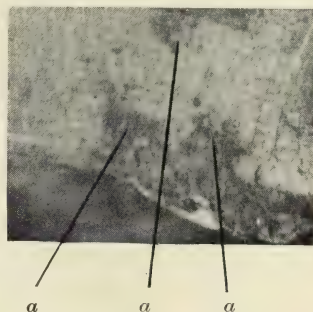
weight. Of the latter, Wood's, Watt's, and Weston's metals are proprietary, but it can be assumed that they approximate in formula Kingsley's (tin 16, bismuth 1), Reese's (tin 20, silver 2, gold 1), or Bean's (tin 95, silver 5), fusing at about 700° F. Several such metal dentures were examined, more lowers than uppers, and presented after short periods of wear on all retention surfaces deep craters, many being filthy in the extreme. (Figs. 6 and 7.) It has long been common laboratory knowledge that after exposure for any time in the mouth these alloys cannot be fused and utilized, owing to the great amount of dross and their increased fusing-point, showing pronounced loss of certain elements.

The behavior of the cast metal bases with aluminum requiring pressure in casting, of which Carroll's formula is typical (aluminum 98 per cent., platinum, gold, and copper making up the remaining 2 per cent., fusing at about 1300° F.) is of particular interest because of the growing popularity of pressure casting with such metals.

Whatever casting machine is used, the results differ little in the mouth from those obtained in the older and more crude apparatus of Carroll, as the slides will show, and we must distinguish be-

into the mold with the metal (Fig. 8), and disintegrations in the mouth, which usually "start" one of these defects near the surface. (Fig. 8.) The rolling of aluminum into plates or the drawing of it into crowns seems to present but little

FIG. 10.



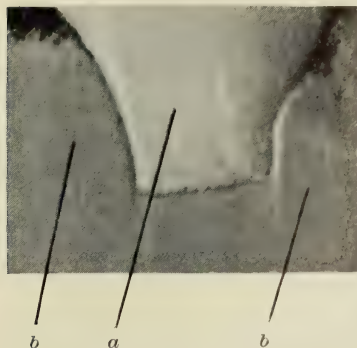
Disintegrations occurring at the gingival line of a swaged aluminum crown. *a*, Deep erosions.

better surfaces, as a section taken from a swaged aluminum crown worn for some time will prove; note how it has suffered at the dangerous gingival line. (Fig. 10.)

The least that can be said is that cast base metals should be most carefully in-

spected before being used, as nothing can be more filthy when they are porous; an illustration of a well-vulcanized rub-

FIG. 11.

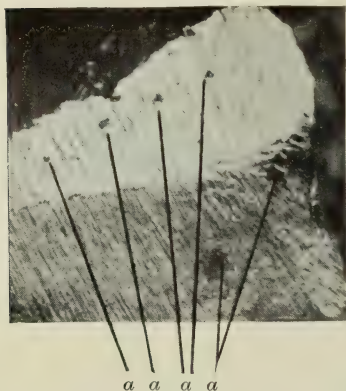


Buccal view of vulcanite plate worn ten years. Same enlargement as Nos. 6, 7, 8, and 9. *a*, Porcelain tooth. *b*, Pink vulcanite.

ber denture worn ten years is submitted in contrast. (Fig. 11.)

It may be worth while to present a section of a pressure-cast gold inlay show-

FIG. 12.



Deep section through 24-k. cast gold inlay cut at three angles. *a*, Defects.

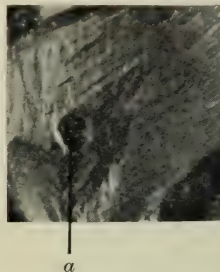
ing open spaces. These defects occur centrally as well as at the margin in both 24-karat and 22-karat gold (Fig. 12); they are obviously too irregular in outline to be borax pits (Fig. 13), and the method or machine appears to make little

difference. The writer is informed that the porosity of gold cast under pressure has been known to the manufacturing jeweler for a long period, and that this is his chief reason for discarding the process.

It would be going too far to claim that any damage is done to the operation by such defects, unless there are numerous and deeply reaching caval edges; there is, however, a danger well worth mention in gold casting methods applied to the platinum pins of porcelain teeth, quite apart from that of "checking" the facing, and to platinum posts cast in copes for crowns.

If the wax of the "disappearing model" be high in carbon, if the carbon be not thoroughly burned off, or if the posts be rough in order to retain them, the high heat of pressure casting, the impact of molten metal in a closed chamber formed by the investment, or all of these factors together, serve to drive the carbon into the platinum, making a combination which is quite brittle, which fractures crystalline under slight strain,

FIG. 13.



Surface section through 22-k. gold solder of matrix and solder inlay. *a*, Borax pit.

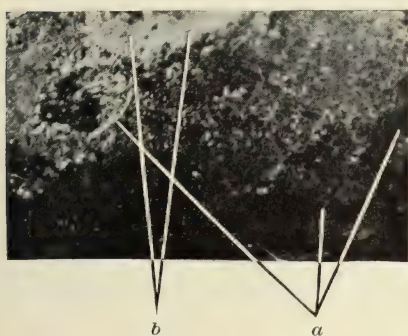
and is completely changed in its physical characteristics; a heavy root-post is thus totally unfitted to meet the stress for which it was planned.

This was noted by Cunningham years ago in the too generous use of the "brush" blowpipe flame on the pins of teeth, and is a fact familiar to the makers of porcelain furnaces.

We approach the question of the be-

havior of amalgam in the mouth with much hesitation. The field is broad, the causes are obscure, and we are but in the beginning; criticism of amalgam is not new, and clinically is prejudiced one way or the other. One fact only is assured, namely, that much needed physical research on this line has been accomplished out of the mouth, and there is room for even greater research chemically as to the behavior of this material after exposure to mouth environment.

FIG. 14.



Well-finished cervical seat of amalgam into which, after set, was anchored gold foil filling. *a*, Craters adjacent to gold in amalgam. *b*, Beginning of gold filling.

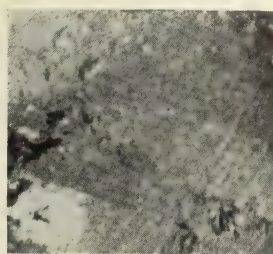
Tin, the principal ingredient of amalgam alloys, when associated with gold cervically as foil under the influence of the saliva loses much of its physical character and becomes hard and brittle. Binary amalgam alloys (tin and silver) placed cervically as the base for gold foil operations are changed along the same lines and to a greater degree. Tin, then, is the active factor, but who will say whether the force acting as to so modify metals is chemical or physical?—for these phenomena do not occur outside of the mouth.

The quaternary alloys, containing besides the usual proportion of tin and silver a small portion of copper, gold, or zinc, or any two of the latter, do not harden as do the binary alloys in apposition to gold in the mouth; those containing zinc 2 parts show, when placed as a cervical seat for gold foil fillings, corro-

sion just about the gingival margin. These spots have been found on well-finished fillings from the hands of careful operators, and have been produced experimentally in the mouth by the writer. (Fig. 14.)

It may be noted that as far as these observations go, ternary alloys (respectively silver, tin, and a portion each of copper, gold, or platinum), while covered with sulfids, do not show degeneration as do the cleaner-looking quaternary al-

FIG. 15.



Craters on well-finished amalgam filling surfaces unassociated with gold.

loys having a small percentage of zinc, with gold or platinum (the writer does not take the latter any too seriously). This is of particular interest, first, because mercury, silver, copper, and tin, the metals common, in the order named, to amalgam alloys, occupy a central position in the series of electro-positive and negative substances, being almost equal in potential, while gold and platinum are as far away and opposed electro-negatively from this naturally combined central group as is zinc electro-positively; second, these four metals combined have long been known as producing the best practical results.

It is most difficult to condense amalgam without defects throughout the filling; pits of corrosion have been noted on amalgam fillings quite independently of contact with gold; these occur on surfaces which have been carefully polished, and do not resemble in the least operative faults due to lack of manipulation. (Fig. 15.)

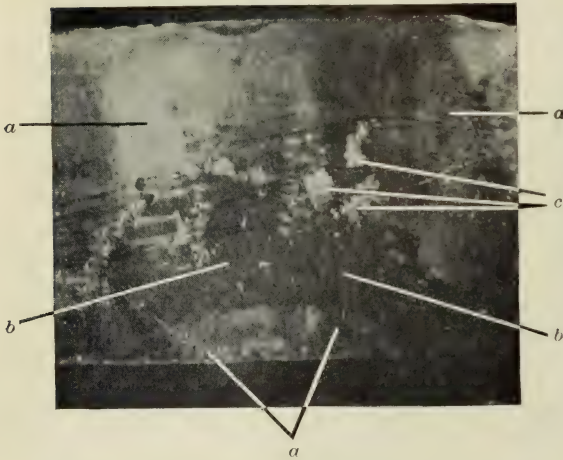
The gingival line, and what occurs to

metals above and below it, is of great interest in this connection. Deposits of dark salts, presumably sulfids, just at this line are the rule even on well-fitted gold caps and well-adapted gold fillings; below the line the gold is bright and as well finished as when placed; vulnerable alloys show a line of pits of disintegration at this point. In gold-plated German silver anchorage bands the row of craters is deeper at the line, with a few

gingival secretions. It would seem that this fact should have some bearing on the yet unsettled question of the beginnings of caries of the enamel, for all the metals vulnerable in the mouth are attacked at this line.

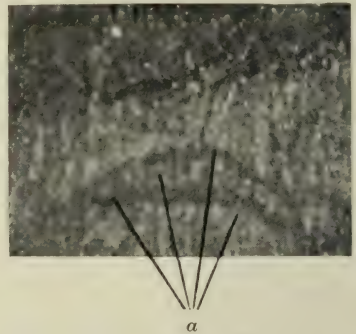
Carefully contoured and finished amalgam fillings (quaternary alloys) built by the matrix, approximately to which later on gold crowns were set, exhibit deep disintegration at the "knuckling," or

FIG. 16.



Approximal portion of gold-plated German silver molar anchorage band exposed three weeks in the mouth, showing damage at the gingival line. *a*, Gold-plating above the line. *b*, Line of craters of disintegration at the line. *d*, Perfect gold-plating below the line. *c*, Deposits of white salts.

FIG. 17.



16-k. gold solder surfaces with lines of corrosion at *a*, just under gingival margin.

craters above it and with a loss of gold plating, which is absolutely intact below the margin and free from corrosion. (Fig. 16.)

Reference has already been made to 18-karat gold solder (Figs. 4, 5, and 17) and amalgam, and to the line of corrosion found on a swaged aluminum crown in this connection (Fig. 10), and in every instance, with the exception of the 18-karat solder, which maintained its finish below the margin, these alloys are dark with sulfids. The metals apparently suffer not unlike the teeth from a combination of the saliva and decomposition of food, and are protected by the

point of contact with the gold surfaces. These crypts are typical, differing in no respect from the earlier illustrations of crypts in gold-plated German silver or platinous gold (zinc 2 per cent.), and are totally unlike operative defects. (Fig. 18.)

If it be not too elementary, the damage produced in gold crowns by the mercury in amalgam fillings, no matter how well these crowns are constructed when placed adjacent to such fillings, may be mentioned. The gold degenerates in these cases as it does outside of the mouth, but in a less degree, possibly owing to the protection afforded

by the colloid substances of the saliva coating the surface of the crown.

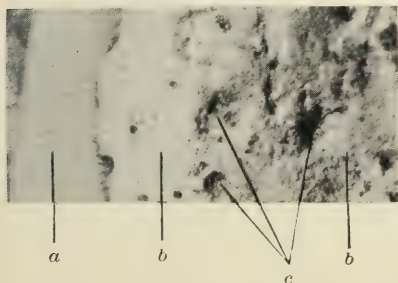
FIG. 18.



Section of the "knuckling contact" of amalgam adjacent to which later was set a gold crown. *a*, Lower third of deep crater. The bright crystalline state of the metal exposed in such craters is very different from the dull sulfidization found in operative defects.

All operators will agree that there are certain mouths in which, no matter what amalgam alloy is used, there is a marked

FIG. 19.



Surface of carefully finished oxyphosphate filling exposed four months in mouth subject to erosion. *a*, Enamel. *b*, Cement filling. *c*, Pits of disintegration.

wasting of amalgam surfaces quite independently of the stress of occlusion or abrasion from dentifrices. Good gold

foil fillings and the 22-karat plate of shell crowns highly burnished, in a short period after having been newly placed assume in such mouths a brassy, almost greenish hue, lose luster, and take on a dull "pumice finish." Chemical erosion with deep "cervical notching" is frequent. Fig. 19 shows the behavior of oxyphosphate in such a mouth. Abrasion from dentifrices as a cause is excluded, simply because careful inquiry proves that such have not been used. These are the mouths characterized by hyperacidity, usually in persons of middle life, in which sulfid staining is rare.

The case about to be reported, one of a few examined, is of this type, complicated by the conscientious use of fourteen years of a popular dentifrice full of soap and diatoms. Twelve good amalgam fillings were placed in the cervical notches of erosion fifteen years ago by one of the best operators in this country. Hidden by high commissure and close lips, they have fully justified the judgment of the operator in selecting such a material, for not a particle of recurrent caries resulted, but all these teeth were notched anew, including adjacent tooth structure.

The illustration presents what was left of one of these operations diagrammatically and actually, removed from the cervix of a lower central incisor (Fig. 20), the notching being in evidence. Fig. 21, with detail, shows the cut of the abrasive dentifrice, and what is of greater import, deep pits (Fig. 22) which are not to be seen in an illustration taken from a section of the tooth side of the same filling, the amalgam being condensed above the average (Fig. 23); so some solvent is at work in this mouth, reducing both tooth and filling, other than simple abrasive brushing. Further, if this solvent action of the mouth environment plus the known and continued use of an abrasive for fourteen years produces in amalgam only such damages as is presented in this case, it is evident that tooth-brush abrasion alone and unaided could not cut cervically the typical notches which we call erosion.

The oral conditions are very similar in the second case to be reported—that of

Mrs. X., age fifty-five, the mother of two sons, respectively twenty-four and twenty-eight years of age, who are

been under the constant care of Dr. E. P. Keech, one of Baltimore's most eminent and conservative dental practitioners,

FIG. 20.

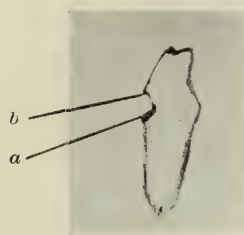
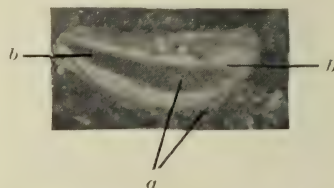


Diagram of lower central incisor showing what was left of amalgam at *a*, and new erosion at *b*.

FIG. 21.



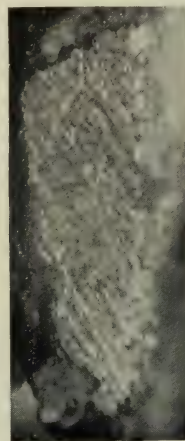
Remains of amalgam filling at *a*, Fig. 20. *a*, Pits in amalgam. *b*, Deep notch cut in filling flush with tooth at *b*, Fig. 20.

FIG. 22.



Enlargement of filling shown in Fig. 21. *a*, Deep craters which appear all over eroded amalgam surfaces. Note the marks of brush, which are deeply continuous from *b* to *a*.

FIG. 23.



Section of tooth side of filling shown in Fig. 22, rubbed down on cuttle paper. Compare the scratches here with those produced by powder in Fig. 22, and note the absence of pits and the well-condensed amalgam.

(These pictures were purposely made under the same light and lens.)

already showing mouth symptoms similar to those about to be described.

For over forty years the patient has

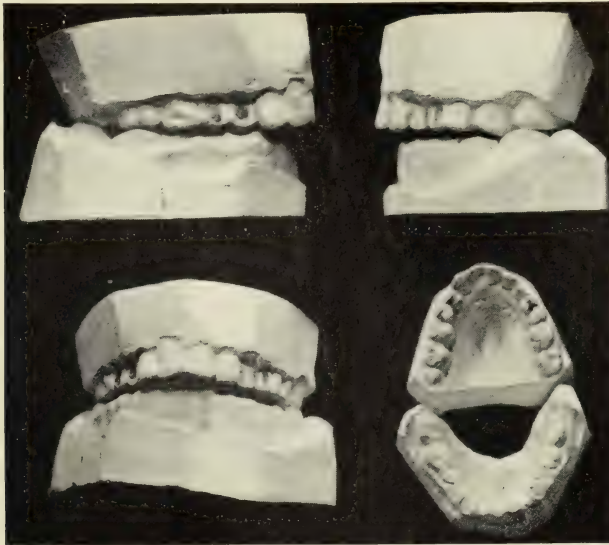
who kindly permits the use of the casts and vouches for the data furnished herewith.

The element of mechanical abrasion either from occlusion or dentifrices is absolutely eliminated from consideration in this case. First, because at no time in twenty years has it been possible to bring the missing teeth in actual contact; second, but one dentifrice, the abrasive portion of which is precipitated chalk, has been used. (Fig. 24.)

The wasting process began early in

ued, sectioning both canines, exposing and destroying the approximal gold fillings previously covered by labial enamel, and cutting the buccal walls of the bicuspid to that half of the width of the crown, exposing and destroying, as the detail will show, the compound gold fillings that had been placed occlusally years before. We wish particularly to emphasize the progressive, equal, and regular destruction

FIG. 24.



Casts taken two years ago. Sectioned gold fillings marked in black in bicuspid and canines. Left upper second bicuspid destroyed and crowned at this period. Note the good condition of the second molars, upper and lower.

life, simultaneously on the anterior upper and lower teeth labially, later buccally, and was met by the best of gold foil operations, as the writer can attest, having seen those extant in the mouth; these fillings lost substance and wasted just as did the caval and adjacent tooth substance retaining the filling until the small part remaining was lost owing to lack of retention. The lower incisors and canines and the contained fillings were the first to be destroyed, progressively from labial to lingual, cut level with and even under the gingiva; the wasting upper incisors were restored by four porcelain crowns, after which the process contin-

of both pure gold and tooth structure in this mouth, without mechanical cause, and to call attention to the fact that while all of the lower incisor, canine, and bicuspid groups are gone, even below the gingiva, and the upper incisors would likewise have disappeared had the four incisor porcelain crowns not stopped the process, *none of the molar group which are all "in situ" have been attacked except at the anterior buccal angles of the upper first molars.*

That mechanical abrasion has had nothing to do with this case is further established by the fact that for at least twenty years these four molars have been

the only teeth occluding, yet they present comparatively slight facets morsally, as noted in the illustrations.

The health of the patient during this period has been good; the salivary analysis could not be made, it being impossible to secure a specimen.

A definite anatomical relationship is shown in all erosion cases between a great loss of dental tissue—and in this case of gold as well, beginning labially and buccally and extending to all parts in direct contact with the fresh secretions conveyed by the ducts of the parotid and the submaxillary and sublingual glands, and particularly of the labial and buccal mucous glands—and the tooth-surfaces exposed to these secretions. This relationship is further emphasized by the fact that the buccal or molar mucous glands are described as being fewer in number than the labial glands, and diminishing

as we follow the buccinator muscle to its distal insertion.

The continued immunity of the molars in this mouth, in which all other teeth have been destroyed, is most impressive, particularly if seen in the light of the foregoing statements and of the anatomy of the parts, which proves it to be more than a mere coincidence.

The writer resists the temptation to theorize as to these carefully observed phenomena, the causes for which he is totally at a loss to explain. Theories are fascinating, but not convincing. As a profession, we need a thorough chemical or electro-chemical investigation of the behavior of the metals in the mouth, as complete and final as the bacteriological work of Miller or the physical tests of teeth and amalgam by Black. Then shall we indeed suit our materials as we try to suit our methods—not only to the teeth but to the environment.

A CONSIDERATION OF THE CASTING PROCESS, WITH SPECIAL REFERENCE TO REFRACTORY MATERIALS.

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A LITTLE over two years ago Dr. William H. Taggart presented the cast gold inlay to the dental profession. Since that time probably 99 per cent. of the profession have, with undeveloped casting devices, crude investing compounds, and a circumscribed knowledge of the general principles involved in casting other materials, achieved enough success to justify them in ascribing the casting process to a most conspicuous place in intellectual concepts. The cast gold inlay has, even in the hands of the less successful, shown such possibilities that the advent of a refractory material which would meet the requirements of the process and a better knowledge of the principles involved is eagerly looked for.

During the two years that have elapsed, little of a scientific nature has been written on the process, while previous to the time of the introduction of the cast gold inlay the profession had little or no occasion to become familiar with the laws governing the casting of other materials.

Our knowledge of this new phase of dentistry must, then, be of comparatively recent origin and of a somewhat allotted nature. About eleven months ago that never-tiring genius, Dr. Weston A. Price, presented the first of his series of articles containing the results of his experiments with the cast inlay. Two months later appeared the second, and five months later the third. In each of these articles appears so much of a scien-

tific nature that to one who desires to pursue a different course of reasoning to a successful conclusion any one of them is positively dangerous. I do not hasten to undo his work, nor even question his result if all the details of his methods are carefully carried out; but in order that I may impress not only upon you, but through this channel upon the whole profession, that his methods are not the only ones pursued by engineers in such work, I must refer freely to his articles. He prefaces his first article by saying that—"To everyone with high ideals there certainly has frequently, if not continually, come a consciousness that gold and its alloys when built into large pieces for dental restorations, whether cast or fused, did not produce either exact or uniform restorations. This has been particularly serious and annoying in bridge work, and the extent of the error has been in proportion to the size of the piece, while the distress it gave the operator was in proportion to the height of his ideals. This constant error has been chiefly produced by the contraction of the metals on cooling and the contraction of the investment on heating, granting that the operator's technique has been faultless."

He goes on to describe how he has determined the amount of contraction there is on cooling metals from their melting-point to ordinary temperature. After constructing an instrument which would magnify the change in dimensions, he cast several bars of gold and its alloys from wax models made on iridio-platinum pins which fitted tightly into the arms of his instrument. His first observation was that no two bars of gold were of the same dimensions, and often there was a large variation. He says, "This error proved to be due to two factors, chief of which was shrinkage of the investing material." To eliminate this error he constructed a form to cast into, which was made of fused pure quartz. He says of his work with this new form: "Bars of gold or its alloys cast in this fused quartz chamber, which itself had a relatively very constant dimension, showed in some cases close agreement

to the total contraction as estimated from the readings of the expansions up from normal, but to my great disappointment different casts of the same metal showed different total contraction, which clearly indicated that another unsuspected source of error existed—for if conditions are the same, results must be the same. This difference in dimensions of the various casts of the same metal or alloy made in the chamber of fused quartz proved to be due entirely to the difference in *casting pressure*, and it was proved that any given pressure will produce constant results, other essential conditions remaining constant. For example, pure gold cast under one pressure contracted eighteen thousandths of an inch, and under another pressure only fourteen thousandths; under another very low pressure twenty thousandths. Eighteen-karat gold solder at a given high pressure contracted fifteen thousandths, and at a given low pressure eighteen thousandths on repeated casts. The great significance of this will be apparent to everyone, as well as its natural lesson, viz, that if we are to get constant results we must use constant pressure as well as have other conditions constant, and to secure the least contraction we must use as high pressure as possible without distortion of the investment—an important point, to be taken up later."

Dr. Price has thus brought forcibly to the attention of the profession a number of things which to a great many may be new. First, he mentions that gold and its alloys contract on cooling. This should not be new to anyone, since a coefficient of expansion and contraction is worked out now for almost everything. Secondly, he mentions that investing materials shrink on heating, and that as a result of this shrinkage and the shrinkage of the gold on cooling no uniformity can be had in the dimensions of castings. Thirdly, he mentions that shrinkage of gold in cooling is decreased by an increase in pressure, and if a minimum amount of contraction is secured we must use as high pressure as possible without distorting the investment. He next calculates the actual pressure on an inlay

of $\frac{1}{8}$ inch square, and finds that with an effective pressure of sixteen pounds per square inch only approximately $\frac{1}{8}$ of a pound is exerted on the inlay. He then estimates that with a casting machine giving 1/100 lb. actual pressure on the gold there would be a total contraction on cooling of twenty thousandths per inch, while if it were capable of giving five and one-half pounds actual pressure there would still be a contraction of thirteen thousandths. He found none of our present investing materials suitable for such pressures nor capable of expanding enough to counteract the shrinkage of the gold on cooling. This grand procession over obstacles now culminates in the production of an artificial stone model which both expands sufficiently to counteract the shrinkage of the gold and enables one to use high pressures in casting.

We must agree that gold contracts on cooling, and that most investments shrink upon excessive heat, but to accept his method of correcting the evil would be to defeat not only the object of the designer of the process but some of the already accepted methods of engineers. The question which naturally arises in the mind of one who has been somewhat unsuccessful in this work is, "Must I reproduce the affected parts in artificial stone and cast directly upon the model to get perfect results?" To this let me say emphatically, No! We cannot con-

ceal the fact that gold contracts on cooling, neither can we obscure our mortification at not finding investing materials that are uniform, if not of sufficient strength and free from change in volume. We still have these two phenomena to successfully combat if we are to keep the cast gold inlay in its present much-heralded position, since most dentists meet with enough failures to keep them feeling that there is something wrong.

It is the opinion of the writer, however, that the amount of shrinkage which takes place in casting an ordinary sized filling is far less than Dr. Price's articles imply, and it is from this line of work that the profession is to receive its greatest benefits.* He has estimated that gold contracts about twenty thousandths per inch, or 2 per cent. This appears somewhat high, though we will grant that it is correct for bars of gold. It has long since been observed by engineers that a great deal more allowance must be made for castings which are long in shape than those which are spherical, a wheel not being as free to contract as a long bar. It has also been observed that the contraction is in proportion to the amount of material used, a small casting having a much smaller coefficient of contraction than a large one. Sharp gives the table below to show the difference in coefficient of contraction between casting spur wheels of cast iron ten feet in diameter and those two feet in diameter:

CONTRACTION IN CASTING SPUR WHEELS IN CAST IRON.

Extreme diameter of wheel casting.		Pitch in inches.	Width of teeth in inches.	CONTRACTION.			
				Total in inches.	Per foot of casting.	Per foot of pattern.	Per inch of casting.
ft.	in.				in.	in.	
10	2 $\frac{3}{8}$	3 $\frac{1}{2}$	12	1.08	0.1059	0.1040	0.0088
6	2 $\frac{9}{16}$	3 $\frac{1}{4}$	9	0.54	0.0893	0.0886	0.0074
6	1 $\frac{3}{8}$	3 $\frac{1}{4}$	11	0.375	0.0613	0.0610	0.0050
5	5 $\frac{9}{16}$	3 $\frac{1}{2}$	11	0.345	0.0631	0.0628	0.0052
2	11 $\frac{7}{8}$	3 $\frac{1}{2}$	12	0.11	0.03896	0.03884	0.0032
2	4 $\frac{1}{8}$	3 $\frac{1}{4}$	9	0.115	0.0397	0.0396	0.0033

* Dr. Price's measurements were taken upon a bar of gold, which is always more free to contract than a circular casting. It is upon this fact that the writer bases his opinion.—M. L. W.

We observe from this that the wheel ten feet in diameter had a linear shrinkage of 1.08 in. per foot, while the one two feet in diameter shrank only 0.115 of an inch per foot, a marked difference, as you see, not merely in the total amount of contraction but in the contraction per foot or inch.

If we now compute from this table the contraction of a wheel one-fourth inch in diameter, the size of a medium filling, we find it so infinitesimally small, and of such minor importance as compared to some other things in the casting process, that we might dismiss it from our minds while casting small fillings. For example, the contraction per inch of the wheel ten feet in diameter was 0.0088 in., and that of the small wheel 0.0033 in., the difference in coefficients of contraction between the large and small wheels being 0.0055 in. The difference in size of the two wheels is 93 inches. The difference in coefficients of contraction divided by the difference in size of the castings ($0.0055 \div 93 = 0.000059$ in.) gives us an average reduction in coefficient of contraction, *with each inch reduction* in the size of the casting, of 0.000059 in.

Let us assume that every time we reduce the size of the casting one inch we reduce the coefficient of contraction (not the amount of contraction) 0.000059 in. If we begin now with the smallest casting given in the table (approximately 29 inches), and reduce it proportionately to the size of a medium-sized filling ($\frac{1}{4}$ inch) we find a coefficient of contraction per inch of 0.0016 in. [$0.0033 - (0.000059 \times 28.75$ in.)]. One-fourth of this amount will give us the actual contraction on a casting $\frac{1}{4}$ inch in diameter, which is 0.0004 inch, providing of course that our average reduction in coefficient of contraction is accurate. And why is it not reasonably accurate, since it is a principle which is verified by practical work in the foundry? The practical foundryman uses for large castings a pattern to construct his mold from which is about 0.10 of an inch per foot longer than he wants the casting to be. For castings of four inches or thereabouts he uses a pattern of the exact size he

wants his casting, the small amount of shrinkage which takes place being cared for by the slight enlargement of the mold in removing his pattern. In castings considerably smaller than these he not only does not make his pattern larger, but makes it smaller by about $\frac{1}{32}$ of an inch, the amount of shrinkage being so small that the rapping and removal of the pattern enlarges the mold more than is necessary to allow for the shrinkage of such small castings. Thus we see our deductions from the table of diminishing coefficients of contraction verified by practical work in the foundry.

We cannot say, then, that cast iron, brass, gunmetal, copper, lead, zinc, etc., that are used every day in the foundries, have fixed and definite coefficients of contraction. We must understand that with every reduction in the size of the casting there is a new and smaller coefficient of contraction. The natural question is, Why? Because the large casting remains hot longer than the small one. In other words, shrinkage is in proportion to the amount of material used, simply because the material for small castings chills the moment it strikes the mold.*

The lesson for us to draw from this work of the theoretical engineer and the practical foundryman is quite forcible and obvious. We are to cast our gold into molds which have been heated sufficiently to eliminate mechanical moisture and allowed to cool down till they can just be handled with the hands without discomfort, if we are to place the casting of gold on a practical as well as scientific basis. From our computation of the shrinkage of a casting $\frac{1}{4}$ inch in diameter, we will assume that it shortens 0.0004 in. if made of cast iron. We

* Many small castings are of such a shape, and the sprue is of such a size, that the linear shrinkage is greater than that of larger castings of other shapes. This is because the smaller casting had its center chilled simultaneously with the periphery, and the result is that there is no hole in such a casting. The inlay, however small, does not belong to this sort of castings, its center being the last portion to cool, and the shrinkage can almost always be detected somewhere around the sprue.

will also assume that Dr. Price's determination of the shrinkage of pure gold is correct, 2 per cent., or twice that of cast iron. With this reasoning we can only calculate a shrinkage of 0.0008 in. if the casting were made of pure gold. Since the shrinkage of such materials as copper is quite well known, and known to be under that which we have accepted for gold, we have great reason to believe our calculations to be approximately correct. If, then, a filling $\frac{1}{4}$ inch in diameter shrinks 0.0008 in. and is seated in the center of the cavity, there will be 0.0004 of an inch to be filled with cement on each side. If the casting be a compound approximal one for a molar measuring $\frac{1}{2}$ inch, we can only calculate a total shortening mesio-distally of 0.0016 in. Imagine, if you will, such a cavity being prepared with all its walls inclining sufficiently to enable one to draw a wax impression, and a filling which had shortened from the extreme ends only 0.0016 of an inch. Do you doubt its going to place? It will do it so closely that the naked eye cannot detect it, if the cavity is properly prepared. These figures will not hold good for casts made in a red-hot mold, or if the gold is superheated. They hold good for casts made of gold heated above its melting-point and a little below its boiling-point, and cast into a cool mold.

The writer has no desire to discountenance the use of artificial stone models and high pressures for cast work, but rather to impress you that it is not necessary to counteract the shrinkage of gold in cooling. There are a number of things which in the opinion of the writer influence the accuracy of a cast to a much greater extent than the shrinkage of the gold alone, though we must not forget that gold does shrink, and that it can be prevented beyond the limits of human error in other parts of the technique, if we will cast it into a dry but cool mold and carry out some of the details which will be taken up in order.

Experience has taught foundrymen that castings are much more free from defects if they use hot metal, although the crystallization is not so perfect in heavy castings. On the other hand, ex-

perience has taught them that the lower the temperature at which the fluid metal is poured into the mold, and the more rapidly the mass is cooled down to solidification, the closer will be the grain of the metal, the smaller the crystals, the fewer and less injurious the planes of weakness, and the greater the specific gravity of the casting. The writer has been able to demonstrate both of these experiences of the foundryman by casting gold heated with the electric arc and oxyhydrogen blowpipe and casting it into fixed forms. We must judge, then, from experience the lowest temperature at which gold can be carried into the mold so as to fill every cavity of it without risk of defect, if we are to meet the greatest number of the requirements of the process. It is an *absolute necessity*, however, to have the gold as fluid as possible and to get the mold filled as quickly as it can be done, or the gold will solidify on its way to the remote parts of the mold. Next to the temperature of the mold, no three things are of greater importance than the temperature and the fluidity of the gold and the quickness of the operation. The writer's greatest objection to the present application of centrifugal force in casting, next to a varying pressure, is its slowness in exerting its pressure. If we are to follow an analogous science in this part of the work, we must have the gold as fluid as it will flow to remote parts of the mold, though not superheated, and carry it to place almost instantaneously. When melted with an ordinary blowpipe gold is not hot enough to be cast into a cold mold. Everyone should equip himself with an oxygen cylinder and yoke attachment for the blowpipe, if he is using an appliance not already equipped with one. It has been the writer's experience that gold should not be boiling when cast. With an oxyhydrogen blowpipe it is easy to boil gold. If the casting be a large one of irregular shape, and the mold has become cold instead of cool, then the gold should be cast upon the very first evidence of boiling, though in no case should gold be dancing up and down; it is not necessary in order to get the gold to its proper fluidity for even a cold mold, and will

oftentimes prevent the gold being carried smoothly to place, besides adding to the shrinkage.

Any amount of heat will not make some golds fluid enough to cast perfectly. They appear sluggish even under the oxyhydrogen blowpipe. They are what the foundryman would call "dull and slow-running metal." In nearly all the processes connected with metals and their alloys, constant reference is made not only to the temperature at which certain operations have to be performed to bring about certain results, but to the condition of the metal or alloy as regards its fluidity. It scarcely seems possible to exaggerate the importance of observing keenly the fluidity of the gold before attempting to make a casting of it. Gold to be suitable for casting purposes must have the property of being readily reduced to such a liquid state that it will permit of its being carried under pressure reasonable distances and still run into and occupy the most minute spaces in a mold. Gold in this condition can, other things being correct, be made into castings of the most intricate forms conceivable. If there are accumulations of a deteriorating kind about the gold, or if the gold has alloyed with something which makes it sluggish, fine margins and intricate forms cannot be produced. Gold must be free from accumulations on its surface, and it *must* be active under the blowpipe. The same is true of alloys of gold and platinum, a great many of which can be cast into certain shapes if they are just hot enough and of the proper fluidity.

The writer has made an effort to ascertain what impurities, if any, there were in the investments now in use which would contaminate a piece of pure gold while it was molten and being cast. A careful analysis was made of seven of the leading casting materials in use in the middle West. Each of them was found to contain silica and plaster of Paris as the principal ingredients, and all of them ferric oxid as an impurity. This was the only impurity that was found which could be considered as a contaminating substance. In one well-known material the ferric oxid was so

evident that a number of casts were made to test its effect upon pure gold, and in each one the gold had changed in color, fluidity, and melting-point. Other observations have been made upon investing materials in which the silica was chemically pure, and seldom has pure gold been capable of retaining its fluidity after being melted three times. Oftentimes golds having slightly different degrees of purity and fusibility have been mixed and cast, but there has not been uniformity in results. Sometimes they have combined properly with each other to form a clean fluid material, while at other times they have appeared to shrink unequally, and have not united into one homogeneous mass. These observations have led the writer to believe that dentists must keep at hand some practical means of purifying the gold regardless of the purity of the investing material or the perfection of their casting appliances. Gold and platinum and their alloys have their fluidity destroyed by repeated heating so as to make them too sluggish to make perfect castings, and if the silica has not been thoroughly washed with acids, the iron which is always present, and which unites with gold in all proportions, will furnish additional contamination. For this reason dentists must study the condition of the gold if they would make a success of casting. A number of different methods of purifying gold might be enumerated, but perhaps nothing will ever be of more service than about equal parts of potassium nitrate and borax. Both are clean white powders which can be mixed and kept in an accessible place.

If a casting is about to be made, and the gold is found to be too sluggish, the operation need not be delayed much over five minutes to purify the gold, while ten or fifteen minutes would raise the karat considerably. The process involves the oxidation of the base metals, the oxygen being furnished by the potassium nitrate, and these oxids being separated from the gold beneath the flux of borax. The gold should be melted and the mixture added a little at a time with one hand, and a blowpipe flame kept directed on the gold with the other, the gold all the time be-

ing kept melted. This should be continued in most cases for about five minutes, though it is often necessary to continue the process much longer. As soon as the last particles of nitrate and borax have been put on the gold the flame should be removed, to avoid its contaminating influence. Gold known to contain certain quantities of tin, silver, or lead could perhaps best be refined by the ammonium or mercuric chlorid processes, but for iron, bismuth, antimony, zinc, etc., nothing excels potassium nitrate and borax.

Another thing of the most vital importance in the casting of gold into a mold as soft as we are at present obliged to use is the amount of pressure used and the accuracy with which it can be controlled. Dentists seemed to have grasped the idea that explosions of gunpowder, sudden generation of steam, crude applications of centrifugal force, the formation of small partial vacuums, compressed air made by swaging devices and the like are forces adapted to the casting of gold. It is true that some good work is done with many of these devices, but the person who expects to make a perfect cast every time he attempts it will learn sooner or later that he can only accomplish this with an appliance which exerts and maintains upon the gold a pressure which is definite. Gold cannot be carried into the mold with a low pressure one time and be thrown into it the next with much greater force any more than the engineer can allow molten metal to fall into the top of a sand mold one time and convey it to the bottom of the mold by vertical gates another time, and expect the same results from each method. A great deal might be said about this feature of the different appliances now furnished for casting gold, but the writer desires to refrain from it and to allow each one to draw his own conclusions.

The last phase of the subject which will be considered, and which is also of the greatest importance, is investing compounds and refractory materials. It can hardly be said that our knowledge of them is in a very satisfactory condition, or even that we know much about

them beyond a few facts gathered through their use. We may observe that a given refractory material for engineering purposes is often called upon to fulfil conditions which are not only different, but exactly the reverse the one of the other. At one time it must resist an oxidizing, and immediately after withstand more or less of a reducing action. Sometimes it must resist the corrosive action of sulfuric acid, at others withstand the action of basic scoria, and at others, again, resist only the action of metals in fusing. An investing compound which meets the requirements of the casting process and bridge work should be strong, set readily, be free from shrinkage and expansion, and resist the action of the heat required to liquefy gold and platinum and their alloys.

Though dental literature seems to be destitute of anything bearing directly upon the subject, an analysis of several products shows that silica and plaster of Paris have wisely been chosen as the two principal ingredients of our present investing compounds. In all plastic compounds there must be something which acts as a binder to the principal ingredients and their modifiers. In investing compounds we have evidence of this in the use of calcium sulfate plus one-half molecule of water, known as plaster of Paris, which in the presence of water takes up some of it and forms a crystallized variety. The combination of water with this salt to form the crystals sets the mass and acts as the binder for the silica. In our amalgams we have the binder formed by the union of mercury and silver and zinc, if the latter be present. In our phosphates the phosphoric acid and its modifications act with the oxid of zinc, while in many cases such as crucibles, muffle linings, etc., clay, a hydrous silicate of alumina, is used as a binder by making the clay anhydrous by baking. The question might be asked, Why is plaster of Paris not used alone? and the answer would be, Because it shrinks when heated. In addition to this it disintegrates when heated for any length of time, though we are forced to contend with this feature, and use the material with possible modifiers in small

quantities as a binder for other materials.

In selecting other materials to use with plaster of Paris as refractories we naturally turn to the oxids, and of the oxids those of silicon, aluminum, calcium, and magnesium, and their compounds, are the ones with which we have to deal. Probably few realize the great quantities of rocks and earthy materials that these four elements cover, silica being the most abundant material of the earth except oxygen. The sands, quartzes, flints, opal, agate, and amethyst contain large quantities of silica. The corundum, emery, ruby, sapphire, etc., contain chiefly aluminum oxid. The feldspars are double compounds of aluminum and silica; mica is a double silicate of aluminum. The clays are chiefly silica and aluminum with ferric oxid. Chalk and whiting are calcium carbonate. Talc or soapstone is a compound of silica and magnesia. Asbestos is also a silicate of magnesia. Thus we see that almost all the materials which we would naturally turn to are compounds of silicon, aluminum, calcium, and magnesium.

It has been the experience of the metallurgical world, and nearly all are agreed, that it is hopeless to look for refractory materials which have given volumetric changes under heat, definite fusing-points, and absence of injurious impurities, among natural products. Such materials must be prepared artificially, since even small quantities of foreign substances often exert their influence to such an extent as to render given desirable products undesirable. One of the most striking examples we have of one material affecting another unfavorably is in the use of alumina, which alone is highly infusible, and silica, which alone is almost infusible. If 1 per cent. to 3 per cent. of alumina be mixed with silica, the mass becomes fusible, while if we raise the amount of alumina to 40 per cent. or more, the mass again becomes highly infusible. If we review the effects which different elements constituting refractory materials have with each other, as well as with a number of other materials which may be used as modifiers, we find that the same

element often produces exactly contrary effects according to the proportion in which it is present, and that there is nothing anomalous in those effects being produced. Alumina, when combined with iron or many other bases alone, makes infusible aluminates, but if silica be present it becomes more or less fusible. Almost the same phenomenon appears in the use of different sizes and shapes of the particles of silica, when silica is used alone, as we shall see a little later. This is but one of many examples which might be given to impress the makers of investing compounds that they cannot rely upon natural market products and meet the requirements of the casting process, unless they watch them with chemical analysis, a good set of sieves, a microscope and micrometer.

The metallurgist who is accustomed to the use of clay for furnaces, muffles, etc., watches closely for a clay of a known composition and as to the mechanical arrangement of the particles. He knows that the plasticity of the clay is due to the fineness of the particles, the presence of alumina, and to water of combination. He also knows that for two materials having exactly the same chemical composition, one being coarse and the other fine, the coarse may be practically infusible while the fine may be more or less easily fusible. He is also aware that the more porous the same substance is, the more infusible it will be. He knows, too, that the plasticity is destroyed by the presence of certain substances, such as magnesia, lime, and iron, and the refractory nature of it by sodium, potassium, lime, and magnesia. The makers of investing materials should profit by the workers in allied sciences, and get down to exactness in composition, exactness in the size of the particles, and exactness in the shape of the particles. One who is skilled in plastics would turn to these phases of the problem at once, though they do not seem to form a part of dental knowledge at present.

Of the four substances mentioned as refractories, *silica* is the one most useful. It is very refractory, is of a desirable color, expands when heated, and

is easily prepared, though it has one objection, that of having no binding quality. *Alumina* is very refractory, easily prepared, desirable to handle, though it shrinks when heated, and affects silica unfavorably as a refractory up to 40 per cent. *Magnesia* is one of the most infusible of substances, is easily enough prepared, and desirable to handle, but it shrinks markedly when heated. *Lime* is not used much in commercial operations, because the carbonate, the only form in which we have it, becomes caustic under heat, and when left to itself absorbs water and falls to powder. It is infusible, but is easily acted upon by silica, and affects plaster of Paris unfavorably. Silica is the only one of the four substances which we can rely upon to expand when heated, which practically means that it is the only rock or rocky material which will invariably expand under heat. Silica stands almost alone as a compound capable of being expanded under heat. *Magnesia* shrinks so much when heated that it should be excluded. *Alumina* also shrinks when heated, and, as we should naturally expect, its compounds do so too.

The writer has examined a number of the leading investing materials somewhat critically and with a view of presenting some suggestions to the makers of the same that would be of benefit. Nearly all of them are using silica and plaster of Paris, and yet no two of them appear alike. The reasons for this are obvious, since one can buy an indefinite number of grades of silica in the open market. A number of these investing compounds contain these two ingredients in proportions which appear quite right, though the problem which has confronted the writer before in the study of plastics seems to be unsettled by the makers of these investing compounds. The profession has given little attention to the physical phenomena in plastics, apparently thinking the chemical aspects the only ones needing attention, but the plan which the writer will suggest for making all investing materials will certainly give a good example of physical phenomena which need to be watched more closely. The products which we have now are

mostly fine ones; a few have some coarse sand in them. An examination of the fine ones for strength shows that after being heated they will scarcely hold together while being placed in a dynamometer. Rarely will a cylindrical piece of them one inch by one inch resist enough pressure to get the hands started on the dial of the dynamometer. An examination of the coarse ones shows them to be stronger though less uniform in their change in volume.

After separating the plaster of Paris from a number of these compounds and examining the shape and size of the particles of silica with the microscope, it was found that in most of the fine ones there was uniformity in the size and shape, while some of the coarse ones appeared like a conglomerate mass of coarse and fine particles without regard to the size or shape. After making a great many castings at different pressures, it was found that the castings made at the low pressures were the truest to shape, the higher pressures apparently causing the finer investments to be bulged in the manner indicated by the cross section of the tooth and filling exhibited this afternoon. It became apparent that even with the Taggart appliance, which has the pressure under absolute control, there was danger at times of distorting the investment unless the pressure was very low. Compounds of silica and plaster were prepared in which the percentage of silica was higher, and the result was a still weaker compound, though less free from shrinkage. The percentage of plaster was then increased, and the mass was stronger, but it shrank in proportion to the plaster used, modified more or less by the shape and size and arrangement of the particles of silica. The problem then appeared to be analogous to the preparation of concrete for pavement, if we were to get the maximum strength and get the mass so tightly filled in that the expansion of the silica would counteract the shrinkage of the plaster during heating. To carry out this plan, nine different grades of flint were obtained from Herman Behr & Co., 721 Beekman st., this city, and examined carefully with a microscope to see if there was uniformity

in the sizes, and all the grades—Nos. FF, 240, 200, 000, 00, 0, $\frac{1}{2}$, 1, 2, and $2\frac{1}{2}$ —appeared good, though all the particles were not of exactly the same size. An analysis was made to find if any injurious substances were present, and it was found that the average composition of the flint was about 97.2 per cent. silica and 2.8 per cent. ferric oxid, the most of which was removed by washing with hydrochloric acid. Three finer products than No. FF were purchased from W. H. Whittaker, 245 Front st., this city, bearing the trade names Nos. 19, 159, and 1900. Four other products were obtained from the Bridgeport Wood Finishing Co. of New Milford, Conn., and 72 Lake st., Chicago, bearing the trade names Nos. 3/100, 3 DP, and 5 DP silex, as well as a very fine grade known as No. XXX lithowhite, all of which were almost pure silica, the only other substance being a small quantity of ferric oxid. Three imported natural products and seven precipitated, chemically pure products were added to make an assortment of sizes. The No. 200 flint was selected as the coarser material to be used, and supposed to correspond to the gravel in concrete. All the finer products were examined microscopically to find a material which would correspond in size to the sand in concrete, and the No. XXX lithowhite was selected as the one to use. The different plasters were also examined microscopically to select one which would correspond to the cement in concrete, and French's impression plaster was selected for the trial.

When engineers determine the proportion of gravel, sand, and cement used in concrete, they select a gravel which is of a size adapted to their needs, and measure out a given amount of it. To this gravel they add water till it just fills the voids and appears at the top of the measured quantity. The water thus used represents the spaces between the particles of gravel, and also represents the minimum amount of sand which they are to use to fill these spaces. A given quantity of sand which will "fill in" well the spaces between the particles of gravel is now measured out, and the water poured

into it, till all the voids are filled. The water thus used represents the amount of spaces in the sand, and the minimum amount of cement to be used to fill in these spaces.

Thirty cubic centimeters of the No. 200 flint were measured out, and water dropped into it from a burette, till it just appeared at the top. The amount of water used was 15 cc., which represented the amount of spaces in cubic centimeters. As is common with dry powders, the No. XXX silica was found to settle after being stirred with water to about one-half its original volume, so that to get 15 cc. of it wet, 30 cc. of the dry powder had to be used. To this amount 10 per cent. was added, as is customary with engineers, to be sure that there is a slight excess of the second or filling material, making in all 36 cc. of the No. XXX silica. To 36 cc. of the No. XXX silica, water was then dropped from a burette till it just appeared at the top. The amount used was 16 cc., which represented the spaces in 36 cc. of the silica, and with a little added, represented the amount of plaster of Paris to be used as a binder.

The trial formula thus determined for the proposed dental concrete, then, was 30 cc. of No. 200 flint, 36 cc. of No. XXX silica, and 17 cc. of plaster of Paris. These ingredients were mixed thoroughly in the proportions named and the mixture was tried out. While it needed a little more of the No. XXX silica to make a smooth casting, the mixture showed the great advantage of using two carefully selected known sizes of silica in known quantities in preference to one size of silica or two unknown sizes. The same plan has been carried out with coarser flint to get an investment for bridge work with equally gratifying results, the result being a mass which was free from movement, more porous, and much stronger. If the plan is carried out carefully, the movement appears to be practically nothing, the expansion of the silica counteracting the shrinkage of the plaster. Other sizes of silica than those mentioned may prove to be better adapted to this work, but it will take

considerable practical work to determine this.

Another class of compounds which may possibly be introduced into this work, but probably upon the same plan, is the different silicates of magnesium in the forms of asbestos, soapstones, etc. They are nice smooth compounds to handle, and with the ordinary heat appear to remain quite neutral in their movement, part of which appears to be due to the blocking up of the mass through their fibrous structure, and part to the arrangement of the silica and magnesia in such proportions as to render the shrinkage of the one neutral by the expansion of the other. There are a number of substances which can be used as modifiers in small quantities with plaster of Paris, though the virtue of most of them seems questionable.

An investing material made on the plan suggested seems to meet the requirements of the process when made of other sizes of silica, and with the co-operation of the makers of these compounds we should have some good ones in the near future, for both inlays and bridge work, which are free from movement, sufficiently strong, and more porous. If the makers of investing materials carry this plan out to a nicety, they should, besides

selecting carefully known sizes of silica or other material, wash the silica with acid to remove the iron, which is certain to be present, and other substances contaminating to gold which may be present in small quantities. This, however, is scarcely necessary, if the flint and No. XXX silica continue to be mined in as nice a quality as they are now. The flint has considerable iron in it, but it is completely covered up by the No. XXX silica, which is a most excellent product. A great many times the washing with acid will change the behavior of a product a great deal, so that the makers of these compounds must watch this phase of it with some care.

In conclusion, let me ask the manufacturers to try out this plan, using as a trial formula, by weight, Nos. 200, 000, or 00 flint 10 parts, No. XXX silica 14 parts, model plaster 7 parts, and watch closely the amount of moisture in these ingredients before weighing.

And of the profession let me ask that each one purchase a small postal scale and a glass graduate, so that the water may be measured and the powder weighed in a moment's time, in such proportions as will make the investing material as thick as can be poured conveniently after having been mixed thoroughly.

CROWNS CRITICALLY CONSIDERED AND COMPARED WITH OTHER OPERATIONS.

By **ALLAN G. BENNETT, D.D.S., Minneapolis, Minn.**

IN some recent articles and discussions that were essentially retrogressive the question has been raised as to the present status of crowning. As the original bandless or collarless crown with its obvious defects is advocated, and nothing really new is being offered, one is reminded of the so-called New Departure of some thirty years ago. Since no real arguments or sound reasons are advanced

for this narrowing of the field and reducing of our resources where much diversity is demanded, we are not surprised to find the same special pleading that was so characteristic of the retrograde movement just mentioned.

Crowns or other methods or processes are "critically considered" within the title of this paper when we try to discriminate by choosing that form of crown

best adapted to meet the requirements—chiefly strength and durability—of any given case. This habit of condemning everything but the one instrument, appliance, or method that happens to be simple or familiar is not creditable to us as a scientific profession. Of course one may find the making of a porcelain inlay or an “extension” filling or a ferrule or collar crown too tedious or difficult, and fall back on something better suited to the operator’s ability; but this surely does not entitle him to condemn what he felt impelled to lay aside or discontinue after an experience perhaps too brief to determine anything definitely. In short, only an accurate knowledge of our resources, coupled with experience and success, entitle one to condemn anything that even a few others have shown to be best adapted to meet the requirements in those cases that all recognize as exceptional and difficult. Of course there are fads and fancies like cavity measurements that are clearly “deciduous,” and there are other things that are manifestly irregular—and demand correction; but such is the diversity, for example, of root-canals, that all kinds of broaches and drills, by hand or by engine, are needed to meet not only all cases but even the personal equation of the operator himself.

About twenty-three years ago I published two articles bearing on this general subject, one on crowns and the other on bridges. The one on crowns was intended chiefly as a summary of the subject, including the writer’s experience; the other, on bridges, being written when the subject was new and strongly opposed by some of our best men, was designed to give the basic principles and rational methods. I recall that those who combated this really new departure without having had even one year’s experience could not have repeated themselves under the same conditions a year later, for the obvious reason that they had yielded to an almost irresistible demand.

But even bridge work was not new except in the sense that it was at that time almost universally adopted, and has not only survived failures, but the kind

of failures that are a disgrace to our profession, yet it led to a positive revival in the art of crowning; and I will say right here that none of the typical crowns then in use have been superseded by anything markedly better, nor does there appear to be any reason for laying aside those that are chiefly distinguished by strength and durability.

Since that time we have passed through a period that has not only given us new ideas and inventions of value, but this period has also been prolific in what may be justly termed fads and fancies of which it can be truly said: “Our little systems have their day and cease to be.” What, for example, could promise more and perform less, and that “less” with less satisfaction, than the much-advertised cataphoresis? And who can deny that high pressure has suffered a sad decline?

What I now propose to say about crowns is the result of more than twenty-five years’ experience. I do not wish to advocate any particular form, except as it best meets conditions, and I would add that my main reason for writing is to show the positive merits of a very simple method of making the collar crown—a method that is at once simple and easy, and neither gives pain nor demands time for its insertion beyond the ordinary bandless crown. The immediate occasion of my writing—and this is where the critical part comes in—was the reading of two or three articles published, together with the accompanying discussion, in the DENTAL COSMOS for 1908.

But first I must make a few preliminary observations. To begin with, it seems necessary to make the general statement that a few points, at least, ought to be considered as settled respecting crowns as well as their extension into bridges. Judging from the partisan tendency that is only too apparent in our literature, the majority of the profession seem to be working away with few if any settled principles, and little or nothing that could be called a conviction, based not so much on individual experience as on the experience of the profession. To take the subject under discussion, almost

every article shows a tendency to place the emphasis on some minor idea or method that, good as it may be, has nothing but its simplicity of construction to recommend it. In other words, the assumption that teeth are teeth and crowns are crowns is too often the basic idea on this and other subjects that can be easily gaged or measured in a more or less literal sense, and, the requirements being open to inspection, can readily be examined and compared, and their conditions and differences carefully noted.

In regard to dentistry in general it ought to be fairly well settled that—

(1) Of all operations that partially or entirely replace the perishable part of the tooth, crowning is, next to filling, the most important.

(2) It is equally obvious that the perishable natural crown is most perfectly protected with a filling or a band that in the one case covers the approximal surface, and in both cases passes beneath the free edge of the gum.

(3) Any filling, at least in teeth below the average, that does not cover the entire approximal surface of the bicuspid and molars and does not pass beneath the gum in this region must be regarded as more or less temporary, and finds its parallel in many crowns that do not properly protect the root, or that irritate the gum or peridental membrane.

These propositions are such obvious platitudes that they are hardly entitled to the space they occupy. I will next attempt to summarize the experience of the profession in regard to crowns and their extension into bridges.

Of course, as before stated, it will be claimed that teeth are teeth, and personal preferences and individual lack of training or skill determine the kind of crown used in all cases. I might remark here that the mental attitude of this class of operators finds expression in such phases as "I like this" and "I believe in that," instead of "I prefer this, for the reason that it best meets the conditions that actually exist in the case." To put it briefly, in matters of science, and especially in questions of physical forces and laws, *personality* counts for little

or nothing, and never as an authority except as it gives expression to the truth of things as they are or as they have always existed.

First: There is no single crown that can possibly meet all the various conditions found in the individual tooth or in the teeth respecting their proximity to or their distance from each other. Very thick-necked teeth standing closely together are difficult to band, and these, unless very short or very long, are just the ideal teeth for the bandless gold base or porcelain crown.

Second: In the next place, teeth vary greatly in respect to the shape, and especially the length and the strength of their roots. When the roots are short, and in particular when they are flat and frail, as they are in many cases of the upper six and in nearly all cases of the lower six front teeth, a band or a collar above and a full band below are always demanded if one aims to avail himself of the best resources of dentistry; and it might be repeated, what has already been implied, that when crowns are very long or very short, the bandless, and especially porcelain crowns, show at once their weakest point and are most destructive to the root.

Third: That an invention cannot be equaled or improved is a hazardous statement to make, and yet I would apply this statement without qualification or apology to the full shell gold crown that has become so familiar on the molars and bicuspid. Since, when properly made, it covers and protects all the perishable part of the tooth, it can be truly called the most perfect device in dentistry; it protects the crown or root of bicuspid and molars precisely for the same reason that a band gives perfect protection to the six front teeth, either upper or lower—it passes beneath the free edge of the gum. But there is this difference, while the full gold crown shell passes under the gum for protection, the band on the upper front teeth is used mainly for strength and the highest degree of durability. One proof of the general superiority of the full shell gold crown is found in the fact that it has crowded out

almost every competitor, and, in the words of the poet, "it reigns without a rival," especially when the "coronation" ceremony conforms to rational requirements.

There are two articles that have appeared lately, one by Dr. J. H. Crossland in the *Cosmos* for November 1908 and the other by Dr. Richard L. Simpson in the *Cosmos* for August 1908, both articles treating of the merits and demerits of banded *vs.* unbanded crowns. But as a constant selective reader and an occasional contributor to our literature, I feel constrained to make some criticisms on these well-intended but in some respects misleading productions. To begin with, the articles both illustrate the familiar method of reasoning which cannot show the strong points of one thing without exaggerating the apparently weak points of the opposite. One would think that politics, if not other subjects equally debatable, had so far discredited this method as to make it unavailable in any subject allied to the scientific.

Dr. Crossland begins his article with this startling sentence: "Conspicuous among those gleaming, glittering, cruel things which have held high precedence in the golden age of dentistry, and from which progressive practice has receded to such an extent that conservatism permits their use occasionally, instead of demanding it generally, is the banded crown." How exactly true this sentence is historically nothing but statistics could determine; but from my point of view I cannot accept it as a correct report of present practice nor as a reliable basis for forming a judgment as to the merits of the two general classes of crowns under discussion. I would base all practice on this general proposition: In view of the various and often conflicting conditions existing in the teeth and their surroundings, it should be the first object of every practitioner to have at his command all the resources of dentistry that experience has established as good and reliable. This ought to be a familiar commonplace to every member of our profession, but both our literature and society discussions too frequently show the contrary.

Referring to the sentence quoted, I should like to inquire as to where conservatism obtains its authority to permit the use of anything that has been successful generally in the hands of the skilful? Because an operation is admittedly difficult, yet has successfully met the most exacting conditions and is the only one that can be used to obtain the best results, who is prepared to prove that progressive practice has caused it even apparently to recede? In other words, the fact that an operation is seldom demanded and therefore seldom performed by the best, is no proof of its loss in status or in value.

I think the majority of progressive as well as conservative practitioners will fully indorse the statement that both kinds of crowns are imperatively needed, and if one be distinctly superior to the other in strength and protection to the root, it is the banded crown, or for general use its modification, known as the collar crown.

It may be said briefly that the sentence just quoted with different wording is equally applicable to other operations, appliances, and methods that seem to have been left in the rear by the mere passage of time and the difficulties encountered rather than by the opinion that they have been outgrown. It applies directly to the porcelain inlay, which by reason of difficulties in construction and its own inherent limits and defects has suffered a decline; it also applies to the "extension" filling, the vertical half-cap anchored in approximal grooves, to Dr. Hinman's devices, and to the gold inlay that some would probably include.

The superiority of the banded or collar crown ought to be as evident as that of a properly placed porcelain inlay in an exposed position in comparison with any other material, or as a strongly anchored gold inlay in large molar cavities or bicuspidis in comparison with packed fillings, or as a perfectly adapted gold filling in any position, but chiefly in "cheaply-put-together" teeth, with a cement lining covering the dentin but never reaching the surface of the enamel.

Those who have found porcelain inlays

too difficult, or have been too easily discouraged by failures, have doubtless been forced to come to the same conclusion, and judging by personal experience I have no doubt whatever that most if not all of those who have used or will use the Bennett-published or the Carmichael-patented vertical half-cap, will sing the same old doleful chorus at any time from three to ten years hence.

I not only use this device after more than twenty years' experience, but I can truly say that it is so much needed, for several reasons that ought to be obvious, that nothing can take its place in the anterior upper teeth.

As a matter of fact, the bandless crown is the oldest and the most defective, and holds its place mainly because of its simplicity, its ease of adaptation, and its cheapness. I am very familiar with what Dr. Crossland calls "that form of porcelain crown in which are united the poetry and philosophy of tooth-crowning—the Logan." Now, though I can feel poetry and understand philosophy, and am very sensitive to fine forms of expression and deeply sympathize with enthusiasm, I must enter a mild protest against crowning this crown as monarch of all on which the profession has placed its stamp of approval. I might say briefly that Dr. Crossland's method of making the Logan pins more rigid and more perfectly adapted to the canal is certainly to be commended, even though it takes more time than would be required to make a band or a collar for the stronger class of crowns. But any method that requires soldering, with the implied risk to the crown, should be very positive to justify the additional time required. Certainly the time required for this improvement of the pin would often produce better results as far as strength is concerned in banding the root.

I find in the August issue of DENTAL COSMOS of 1908 a still heavier onslaught on the banded crown, and that, too, by a man who has had experience and has even achieved some reputation as a maker and an advocate of this form of crown. I must be allowed to feel no little surprise to read that there is not even

"any intelligent excuse for a banded crown." Evidently the author has the courage of his convictions, with all the credit implied. If this form of crown has "only two points of excellence—(a) prevention of root-splitting, (b) more secure attachment," I fail to see the logic that "This contention is like paying fifty dollars to collect ten." In the first place, in view of the number of roots that are lost by splitting and the significance of such an accident to both operator and patient, almost any device that would make one secure against such an irretrievable disaster ought to hold its place forever against all newcomers. As to security of attachment and protection to the root in every sense, the banded or collar crown if properly made has really no rival. It is often difficult to tell which surprises us most, the durability of some porcelain crowns or the utter failure of others that were in the mouth apparently under the same conditions.

As I read on I was even more surprised to find a list of twelve objections lined up against the crown in question. Summed up, these objections are that this crown is too difficult and time-consuming, and too painful. Unsightliness and irritation are both easily preventable. As to adding strength to the crown, that depends on how it is made; if only slight strength is added to the attachment, this is wholly due to error in construction. The last objection, "It adds no other protection to the root which could not be more easily secured," is the most surprising of all. If such a mode of protection exists, it should be promptly published or patented, and in either case given to the profession without delay. This is simply another illustration of the familiar theoretical objection of the so-called practical man, whose feeling of certainty seems to hold an inverse ratio to the extent of his experience. Yet here is one whose experience appears to have produced a reaction. To belittle the band or the collar is simply an attempt to undervalue what is the only preventive of root-splitting, and the first of these—the ferrule—is absolutely the only remedy for such a disaster to the root when

it is not already actually ruined. I have yet to see or hear of a root that split with a properly applied band or collar, and I have banded several split roots—centrals and laterals and bicuspid—that after from five to ten years are still doing service. As a matter of fact none of these roots would have split with a proper band or collar, and it would have been economy to have applied the preventive at first instead of at last.

Every intelligent practitioner ought to be able to decide at a glance, almost, the ratio between strain and resistance, the strong jaws, close bite, and comparatively weak teeth or roots, and select or make his crowns accordingly. The writer just quoted, who makes such a good point on what he terms the "snug harbor," and then finds twelve points in favor of the bandless crown and none against it, fairly takes one's breath away. I would try to be satisfied with half as many good points, but cannot find them even by aid of special pleading. Once more one is impelled to exclaim, with apologies to Flagg of the New Departure, "The fatal facility of easy construction" is responsible, not for success in tooth-saving, but for rapid, careless work that "pays" the operator much better than the patient. It really would seem that the better a method, provided it be somewhat difficult, the more it stands discredited with the average man, whose standard is a simple, easy method that, because it can be applied to the simple, easy case, is therefore best for all. How often the average man condemns special methods for special cases simply because they are difficult. He confidently asserts that nothing or nothing better can be done, and the "other fellow" often gets the case, and as many more as the patient can influence. There are doubtless thousands who condemn all the finer, the more artistic, difficult, and conservative as well as progressive operations, such as porcelain inlays, "extension" fillings, bicuspid crowns with porcelain fronts, banded and collar crowns, bridges retained by vertical half-caps—the Bennett-published or the Carmichael-patented—and the Hinman method. As a parallel case, how many men are endeavoring

to attain the standard set by Dr. Black? And yet individuals and clubs are demonstrating that his ideas and ideals are attainable, even though they demand much care and patience with much painstaking, and not a little pains-giving persistence. In the writer's opinion, based on his experience, the art of filling will reach its final stage when the various materials are so combined as to blend the good qualities of each, the whole structure to be based on a proper cavity lining, the merits of which appear in properly seated inlays.

But let me give the conclusion of the whole matter by a few closing words on crowns. If the band or ferrule crown is confined to six or eight teeth, the six lower front and the upper laterals, it certainly has a most useful field, and is so essential as to hold its ground against all rivals. The lower roots can be left fairly long without displaying the gold, and can be fitted with no more pain than is experienced in preparing the average cavity.

But the ideal, the standard crown, for the six upper front teeth is the collar crown, invented nearly thirty years ago by Dean Litch of the Pennsylvania College of Dental Surgery. The collar has almost all the advantages of a band, with none of its objections. It brings all the strain to bear on the root and not on the pin, and it does not irritate if properly adjusted. I mention this because it is the strongest and simplest yet suggested, and in order to give a very simple method of construction that has proved to be most satisfactory in my hands.

The first essential is a root with a slight palatal projection about a line below the gum, though some can be longer. In other words, trim the root off under the gum in front, sloping across the end so that the palatal portion has a projection on which to grip the collar.

The second essential is to scale carefully the enamel so as not to round the projection unduly, and extend this scaling about two-fifths around the root, and in some half-way around, according to the thickness or closeness of the teeth.

The third essential is to fit a piece

of pure gold, No. 32 or 33 gage, in the usual way on the end of the root, having an extension at the rear sufficient to inclose the projection and pass under the free edge of the gum. This extension is a little wider than the base on the root, is fan-shaped, and is divided up to the root with shears. Pass the pin, which should always be as long as the root will allow, and round, rigid, and of No. 14 or 15 gage, and burnish the gold against the end of the root, and bend it up partially at the rear. Then remove and complete the bending and overlapping of the cut edges in the center. After annealing, return the gold to the root, readjust it on the end, and while this portion is held by a broad plugger in the hand of the assistant, carefully press the gold on all surfaces of the projection and up under the gum. The case is then ready for the impression, which should remove the gold and the pin intact, or draw them smoothly from the plaster and leave it unbroken. The pin of course should project about the length of the teeth, so that the plaster can hold it securely.

When the model is made and the tooth is ground, backed with pure gold, and waxed into place, the case is ready for investing, drying out, and soldering at one heat. Particular attention must be given to completing the collar, which

should be soldered first. The smaller and narrower ones are completed simply by thickening with solder. Use 20-k., and after uniting the overlap place on a crescent-shaped piece and partially fuse this, completing the case with 18-k. so that the 20-k. cannot be re-melted. On all larger and broader collars place a crescent-shaped piece of crown gold, No. 32 gage, and unite with 20-k. solder as before. Care must be taken to have enough thickness just where the base and collar meet, or this line may be too thin for strength or be worn through later.

Just here I will venture to repeat the hazardous statement already made, that no invention or improvement is ever likely to surpass the simplicity, ease of construction, strength, and durability—in a word, the perfection—of this crown to meet the essential conditions that are present in every case of the six upper front teeth. And I will further say that I am confident that a fair trial with each requirement correctly complied with will convince the most skeptical.

After what I have said about banded crowns, I may surprise the reader by stating that I have not made five in ten years, and all of these in the lower front teeth. Except where the expense must be considered or the root is too short, I use the collar crown exclusively for single teeth as well as for bridge work.

THE CENTRAL THOUGHT IN THE CONSIDERATION OF PULP AND PERICEMENTAL DISEASES, WITH ESPECIAL VIEW TO DIAGNOSIS.

By OTTO E. INGLIS, D.D.S., Philadelphia.

(Read before the Connecticut State Dental Association, at its annual convention at Hartford, April 20, 1909.)

ASIDE from fermentative changes which occur in the mouth and act as the causes of dental caries, pyorrhea alveolaris, and pulp putrefactive changes, no subject is of such importance

for the proper consideration of the pathology and symptomatology of pulp and pericemental diseases as those of hyperemia and inflammation. The contemplation of inflammation properly includes

that of hyperemia, for it is really a series of hyperemic changes with the added pronounced feature of immigration of leucocytes and exudation of lymph.

A correct mental picture of arterial and venous hyperemia and of inflammation, coupled with a knowledge of the causes of these conditions, enables one to view with the mind's eye all the pathological conditions which are met with in clinical dentistry. A little imagination based upon a fine differentiation of grades of vascular disturbance enables one to diagnose with reasonable accuracy, and to apply indicated therapeutics with a success which does not attend a haphazard judgment of the particular case. I am reminded in this connection of a lecture delivered by Professor Garretson some twenty years ago upon the subject of pleurisy, in which he said that a doctor sitting in his chair listening to a patient describing correctly the typical symptoms of a case, could correctly, and without leaving his seat to examine the patient, say at once, "A case of pleurisy." Many times I have applied his dictum to cases in dental practice. A good description of symptoms by the patient, perhaps brought out by a few well-directed questions, has enabled me before looking into the mouth to say to myself, "A case of hypersensitive dentin;" "A deep cavity somewhere about;" "A case of pericementitis;" "A case of pyorrhea alveolaris," etc., and I have been almost surprised at the frequency with which a glance has been sufficient to confirm the diagnosis, and in other cases only a short examination, the removal of a filling, etc., has been enough to confirm it. Do not understand me to say that a close search is not sometimes necessary, nor that doubt may not exist when many teeth are possible causes of rather obscure reflex pains, but the general proposition of Dr. Garretson that "In the main, diseases tell all about themselves, if we have the knowledge to understand the symptoms," holds good in dental as well as other diseases.

To return, then, to our general subject, we may begin by defining arterial hyperemia as an overfulness of arterial

vessels, due to a determination of blood to a given part as the result of reaction to irritation. So long as it remains such without an excessive immigration of white corpuscles it is arterial hyperemia.

In venous hyperemia the cause is essentially different, in that some obstruction to the vein prevents the return of blood to the heart rather than invites blood by irritation. A weakness of the heart or some inefficiency of the minor assistants to circulation, as the valves of the veins or thoracic movements, may cause a collection of blood in the veins, but this cause rarely acts in dental lesions. The backing up of the blood following venous obstruction produces tension upon the vessels, followed by diapedesis of red corpuscles and exudation of watery fluid—the condition of edema. In inflammation arterial hyperemia appears as the first stage, followed by a collection of leucocytes along the walls of the small veins, and the immigration of some into the perivascular tissue. As this eventually leads to stoppage of the blood current, and even to stasis, the condition is essentially a venous hyperemia. Accompanying the immigration of leucocytes is an exudation of lymph, highly coagulable in character, which distends the lymph spaces in the tissue and produces the characteristic swelling.

In the consideration of arterial hyperemia we must take into account that if it be maintained there is an increased nutrition of tissue as the result of the excess of nutritive material in overfull vessels, and that in consequence the functions of all cells are increased. This expresses itself in constructions, such as hypertrophy, and in increased nervous activity or irritability and increased temperature due to increased oxidation. For these reasons we may expect in arterial hyperemia increased growth and greater response to tactile and thermal irritants. As the hyperemia increases these are also increased, so that a pulp or pericementum responds to irritants in accordance with the measure of increase in overfulness of the bloodvessels.

The results of venous hyperemia are opposite to these, in that, as it increases,

the venous blood held in the part has its nutritive supply exhausted and the backsetting prevents an influx of new blood. The result upon the cells is a loss of nutrition, less oxidation, and hence coldness of the part, and degenerative tendency in the cells.

In inflammation both tendencies occur in the different areas. Thus in the area of stasis there is coldness and degeneration, while in the surrounding area, which is in the stage of arterial hyperemia, constructive changes may occur if the inflammation be long enough continued, while in the intermediate area resorptive activity is apt to be set up as an effort upon the part of nature to remove an irritant.

Applying these principles to pulp and pericemental diseases, we find that when we have in the pulp a mild hyperemia, such as would result from the exposure of the dentinal fibrillæ to irritants, such as friction, chemical irritants, thermal changes, etc., there is almost immediately a constructive reaction. The odontoblasts produce transparency of dentin and secondary dentin opposite the area of injury, in an apparent attempt to close the tubules by the construction of new tubular substance (tubular calcification or consolidation), or to throw up a barrier within the pulp cavity (secondary dentin).

In slowly progressive dental caries the result is similar, for the same reason. As the pulp must atrophy to accommodate secondary dentin, it is often the case that another form of constructive change occurs, namely, pulp nodules, and if the atrophy and degeneration continue there is apt to occur either death from vascular disturbance or further depositions of calcific material, without regular secretory activity, such as calcific degeneration. Strictly speaking, the degeneration probably precedes the calcific deposition, which should occur in the diseased area.

If more severe irritants act, such as thermal shocks through deep cavities, abrasions, erosions, fractures, ground teeth covered with metal, deep cavities filled with metal, septic dentin under a filling, or such as a blow or constant

impact, as in the various forms of malocclusion, or when reflexes occur from other points of irritation, or when an area of inflammation existing in a nearby area extends in the direction of the apical tissue of the tooth in question, the pulp becomes overfull of arterial blood, and reacts to thermal irritants in proportion to the overfulness. It also produces in the odontoblasts a degree of hypersensitivity conforming to its own increased irritability.

A simple example will illustrate the nature of these responses to vascular overfulness. I one day caught my lower incisor outside of the upper, and the return of the jaw to its place produced sufficient force to strain the lower incisor a little. For a day nothing was noticed; later the lower tooth began to be slightly sore to the touch and at the same time began to respond to cold water taken into the mouth. The next day it responded still more, so that it became necessary to shield it from cold substances. The next day the symptoms had subsided somewhat, and in a day or two more it was in a practically normal condition.

Perhaps an analysis of the pathology and symptomatology will be of value. First, pericemental injury followed by pericemental hyperemia; by simple contiguity an overflow of blood into the pulp followed, which produced increased irritability of its sensory nerves, hence the increased response to cold. In the recovery the pericemental hyperemia subsided, draining the pulp of the excess of blood, the pulp hyper-irritability subsided, and the response to cold lessened, until the normal non-conductivity of the enamel and dentin was sufficient to protect it against thermal shock. In this case it is probable that general dentinal sensitivity was also increased, rendering possible a painful fibrillar reaction by conduction of cold through the enamel.

If we analyze a common case of hyperemia through a filling or open cavity, we find a similar pathology working in the other direction. Thus from one shock some hyperemia of the pulp bulb results, mild in character. More shocks, more

hyperemia, and as this goes on the thermal tolerance is lessened until the pulp is shocked by the slightest variation in temperature from the normal, even a breath of air being sufficient to start a paroxysm of pain. If the case be one which affects the entire pulp a pericemental hyperemia is liable to be produced, which renders the tooth tender to touch. This is especially noticeable in profound pulpitis, with which there is always associated some hyperemia. The overfulness of the pulp vessels causes an overflow into the pericementum, which thus becomes hyperemic.

The anatomical situation of the pulp, boxed up in unyielding dentin, compels the artery and vein to lie side by side at the single apical foramen. As the enlargement of the artery necessarily compresses the vein, it follows that a venous obstruction is set up. The blood is held back in the venous system of the pulp, while an increased influx enters by the arterial vessel. The result is necessarily increasing vascularity of the pulp by venous hyperemia. For this reason profound arterial hyperemia usually ends in venous hyperemia, and not infrequently the diapedesis of red corpuscles and the solution of their hemoglobin causes the pulp and the dentinal fibrillæ to be stained pink. Even with a congestion of this degree the pulp may live for some time, even months, even though the bulb may be dead, which, to my mind, argues for a collateral circulation in the pulp tissue, which some prominent observers claim does not exist.

Looking at this pathology from a clinical point of view, we would expect to find, first, an increasing response to cold as the arterial hyperemia increases, and a decreasing response as the bulb undergoes stasis and degeneration, while in the intermediate stage the extreme paralysis and distention of the bloodvessels may lead to continuous boring pain, and when the pulp is opened, to profuse bleeding which may not readily subside.

The therapy of these hyperemias, of course, depends upon the nature of the cause. If due to conduction of thermal changes, these must be corrected by non-

conductors or by the shielding of the tooth.

If the hyperemia be not too severe, as after gold filling in cavities of moderate depth, the pathology may be considered as either produced primarily by conduction or it may be argued that the injury of the fibrils has produced a pulp reaction favoring a response to cold. In either case counter-irritation and shielding often have their reward in a subsidence of symptoms after a few weeks.

In carious cavities, sedation and the use of non-conductors are usually effective, except in cases of exposure of the pulp, which is then better devitalized, as a rule. In this same devitalization, if arsenic be used, we have to consider the death of the pulp through the production of a rapid venous hyperemia superinduced by the devitalizing action of the arsenic. In the death of the apical portion of the pulp the pericementum often becomes hyperemic. This view, which is clinically proved by experience, removes the fear of apical arsenical necrosis in well-developed teeth. In cases of external injury or extension of an area of inflammation into apical tissue, the cause should be removed and the general principle of rest, counter-irritation, and possibly general derivation employed, without any resort to interference with the pulp undergoing reaction.

In profound venous hyperemia of the pulp, sedation often fails, and only depletion by pricking the pulp, or in some cases burring out the bulb under nitrous oxid anesthesia, will give relief from the pain. The pulp must be destroyed.

In acute inflammation of the pulp we have many of the symptoms of hyperemia, because the inflammation is a hyperemic condition, plus the characteristic immigration of leucocytes and exudation of lymph. The pain is heavy, continuous, and boring, or may be lancinating or jumping. In the later stages recumbency allows the blood to flow into the paretic vessels, which may excite to pain a previously quiet pulp. Pain in response to tapping is due either to concussion of the inflamed pulp or to associated hyperemia of the apical perice-

mentum. When exposure exists, suction, pricking with a pin, etc., the pressure of food in mastication, chemical irritants such as salt, sugar, acids, and the products of fermentation or bacteria, may individually produce pain.

If pyogenic organisms have reached the pulp and infected it, pus probably forms, either upon the surface of the pulp or in its substance. If the pus is confined, pain in response to heat and relief from the application of cold are the chief symptoms, though passage from one temperature to another or touching with the tongue will often excite pain. Sometimes the venous hyperemia proper, or that associated with inflammation, will have caused death of the pulp bulb, and this becoming infected and putrefied, the gases formed cause a peculiar delayed reaction to heat, though in quite a number of cases the predominant symptom has been a tenderness to touch, as though an abscess were forming—that is to say, pericementitis is present. I have quite often found in the canals of teeth root-fillings overlying living pulp remnants which were supposed to have been removed years before. In one case as many as twelve years had elapsed between the time of root-filling and the serious irritability of the pulp. In such cases are found combined, pain in response to heat, or even to cold, and pericemental tenderness.

There is often present, occurring at intervals, a sudden stab of pain, as though a wire had suddenly been run into the pulp, which pain may cease immediately. In other cases reflexes to some other part occur, simulating so-called trifacial neuralgia.

A considerable portion of the pulp may be alive, so the inference is that any pericemental reaction is due to extension of inflammation from the pulp, though the possibility of apical infection from the infected pulp cannot be wholly ignored, especially as in some cases distinct gingival or even facial swelling occurs. Upon opening and removal of the dead portion of the pulp and the use of an antiseptic dressing, there is seldom any further sign of abscess.

The total death of the pulp from ve-

nous hyperemia or inflammation is gangrene, which may, however, be partial in many cases. Here we have two varieties: First, the dry form, in which the pulp, under aseptic conditions, shrivels to a thin thread, a condition very rarely to be found; second, and very common, moist gangrene, in which the moist dead pulp admits bacteria which cause it to putrefy. The chief consideration in the pathology of this is its action as a chief cause of apical abscess, or sometimes non-purulent pericementitis of chronic nature.

Often leakage of gas through dentinal tubules forms a sufficient vent to prevent abscess formation. Thus the patient complains of a bad taste in the region of the tooth—which, however, may be due to decomposing material in an ordinary cavity or to stagnant food collected between the teeth or about the margin of a rough filling.

Sometimes pain in response to heat or the passage from a warm to a cold atmosphere, and *vice versa*, is sufficient to start apical irritation. This symptom is, however, more often associated with abscess of the pulp.

As one would expect, the tooth is discolored by iron sulfid as a rule, the dentin is insensitive to cutting, the chips have a foul odor, and the passage of an interrupted electric current produces no shock. These symptoms, or lack of them, together with opacity to transmitted light in more doubtful cases, are plain evidence, yet in previously treated teeth some imagination and courage and careful procedure are required to remove an apparently good root-canal filling from a tooth which has a portion of dead pulp in an imperfectly filled root-canal, and which is causing chronic apical inflammation without actual apical abscess. Here again, however, an odor is usually perceivable, and careful removal of the root-filling usually unearths the expected gangrenous pulp remnants within the apparently empty apical portion of the root-canal, into which a very fine Swiss broach will usually pass as soon as the canal obstruction is removed.

That the apical abscess is an inflam-

mation is a matter of course, but the phenomena of sequential desire to handle the tooth, tenderness, soreness, and exquisite soreness are all significant of the degree of irritation of the pericementum, while the slight extrusion and finally elongation and painful malocclusion are symptomatic of the amount of exudation present. The character of the swelling upon the gum and the facial involvement are also full of meaning as to the advancement of the suppurative process in its passage through the bone and gum.

A definite condition of apical abscess is not usually difficult to diagnose, if one remembers that such a state is due to moist pulp gangrene in all cases not recently subjected to infection by instrumentation, and the clinical picture becomes clearly defined mentally if we recall the pathological phenomena of infective inflammation. Located in apical tissue, the swelling of the same causes extrusion of the tooth and looseness, while the inflammation present causes the tenderness to touch. Here, though, we have refinements of the pathology in a series of phenomena varying from simple desire to work the tooth with the fingers to facial swelling and looseness—the degree of involvement, of course, being dependent upon the extent of the suppurative inflammation, the resistance of the tissues, and the capacity of the individual for endurance. In diagnosis the symptomatology of moist gangrene is always to be considered.

Other refinements may be carefully thought out, namely, why pus appears first, then blood, upon venting a tooth; why pus sometimes does not appear; which root is affected; whether a pyorrhea pocket or a dead pulp is the cause of an abscess apparently apical; why a fistula cannot be washed through from the root-canal, and many other complications which may arise in treatment.

Many times I have seen in dental literature a reference to dry gangrene of the pulp, with a description of a foul canal appended. Dry gangrene is of very rare occurrence, at least as applied to the whole pulp. The pulp is probably so affected in many cases of root mummification,

but I believe that a true dry gangrene rarely causes trouble. It is rather putrefaction, which involves liquefaction and gas formation as its end-product, to which we must attribute the apparently dry but foul canal sometimes observed clinically. Of course, the pulp being dead, the dentinal insensitivity and opacity are present in dry gangrene, as will also be a shrunken and fibrous pulp remnant. In such a case subsequent infection may cause apical abscess.

In non-septic pericementitis we have the same general considerations of hyperemia and inflammation without the formation of pus. The tooth may be as tender, or more so, than in the septic form, but a history of the tooth, its subjection to external violence, or internal, mechanical, or chemical injury to apical tissue, leads one to careful differentiation from infective inflammation.

In this connection I would point out the relation of a non-septic pericementitis to a septic one. Just as a case of arterial hyperemia of the pulp due to pyorrhea located in the pericementum, or an abscess upon an adjoining tooth, can only occur through previous irritation of the apical pericementum—or possibly a reflex—so this pericemental reaction must be looked upon as an extension of inflammatory action from a septic site, yet in itself to be aseptic, for in most cases the septic area is circumscribed. It may extend and involve the previously aseptic area, but still there will remain an aseptic area which may involve another pericementum, or a more remote portion of the same pericementum. It is for this reason that we may have in the same pericementum a pyorrhea, which is a suppurative or infective inflammation of the pericementum primarily, associated with degrees of vascular disturbance which produce on the one hand construction, as in hypercementosis, and on the other destruction, as in resorptions of cementum.

In like manner may we consider gingivitis, both marginal and interstitial, as being either septic or non-septic in nature, and whichever it is we may look farther for a non-septic area, and often,

as previously stated, for reactions, such as pulp hyperemia, which may seem of distinct nature but are really simply extensions of hyperemic areas into a peculiar anatomical situation.

The neuroses associated with these hyperemic and inflammatory states are simply nervous reflexes, often difficult of exact etiological determination, but frequently by the aid of careful differentiation and explanation, or by the aid of the Roentgen ray, are referable to definite pulp or pericemental reactions.

While this paper has necessarily not dealt with many factors underlying dental pathology, and especially not with constitutional factors, which may be in the main regarded as predisposing rather than exciting, I believe that the essential views which must ever be kept in mind in diagnosis, particularly in obscure cases requiring differentiation, have been presented, and if they prove to be of as great comfort and utility to my hearers as they are to me daily, I shall be repaid for my trouble.

SOME CASES OF STOMATOLOGIC INTEREST.

By JAMES E. POWER, D.M.D., Providence, R. I.

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IF one wishes to interest a body of stomatologists, he must describe in detail the pathology of each particular case. Not only this, but the lecturer should also give expression to his interpretation of the pathologic manifestations, thereby explaining, to a degree at least, his reasons for the definite line of treatment which he has followed in a given case.

By following these lines an intelligent discussion may be stimulated which will add to our store of scientific knowledge in such a manner that we may become worthy of the name diagnostician. When we reflect upon the fact that neither medicine nor dentistry is an exact science, we may well marvel at the wonderful results which are accomplished in these professions in the treatment of disease.

Diagnosis means guessing, but it also means—or at any rate it should mean—scientific guessing; guessing based upon a proper knowledge of the sometimes invisible processes which take place in the production of disease. *Διὰ*, meaning "through," *γινώσκω*, meaning "I know,"

is the way the Greek had of saying that the treatment of disease is based upon inductive philosophy, and that if we wish to become worthy diagnosticians we must understand the processes which are associated with all pathologic conditions. Many processes of disease are intimately connected with one condition, inflammation, and since the cases which I have selected to present to your honorable body have an organic relation with each of the many factors which produce this condition, it will perhaps be of interest to say just a word upon the successive changes which begin with stimulation and end with suppuration. I shall not enter upon a detailed description of the experiments of Grawitz, Metchnikoff, Thoma, Sutton, Adami, and others, whose labors have not only made our understanding of this subject more complete, but have also rendered the study of inflammation and of the activity of the polymorpho-nuclear leucocyte—which is really part of this process—one of the most romantic pages in the volume of modern medicine.

The cardinal symptoms of inflammation are *calor, dolor, rubor, tumor*, with impairment or loss of function. Heat, pain, redness, and swelling—these conditions are usually associated with disease, and unless we are familiar with them, as well as with the conditions which produce them, we are unable to follow that great law which says, "To treat intelligently or to cure disease, first remove the cause." By this is meant not only the original cause of the pathologic condition, but also the causative factors which produce the heat, redness, swelling, and pain.

Whether the exciting cause is traumatic, thermal, parasitic, bacterial, or any of the other causes which produce disease, we shall always find present these four signs of inflammation.

For illustrative purposes we shall compare the bloodvessels to flexible rubber tubes. Under normal conditions the system provides for the passage of a certain quantity of blood through these vessels or tubes. If anything, whether of a chemical or physical nature, be introduced into any part of the body, and the natural harmony of the part be interfered with or destroyed, stimulation will start the processes which are known as the inflammatory processes.

I shall try to describe briefly those changes with which all forms of disease are associated—first, in the presence of a foreign element in the tissues, generally bacteria. This is followed by a constriction of the bloodvessels. This latter stage is only a momentary one, and dilatation of the vessels with an increase of blood to the part follows. The blood-stream in these vessels is composed of an axial and a peripheral zone, the solid elements of the blood being confined to the axial, and the liquid or plasma portion to the peripheral zone. Finally we see the polymorpho-nuclear leucocytes leaving the axial zone and migrating toward the sides of the vessels. They first appear as beads on the inner side of the artery, then the leucocyte changes its form, and finally a portion of this white cell appears on the outer side of the vessel; then by virtue of its amœboid motion

it passes through the vessel wall and journeys onward to the seat of injury. Next in order is the exudation into the surrounding tissues of the fluid elements of the blood in the nature of serum, which carries with it a ferment which causes the formation of fibrin. In conjunction with this process we get diapedesis of a few of the red cells also. You understand, therefore, that an inflamed area is produced by a definite number of changes, and that if inflammation be allowed to terminate, we shall have present in the tissues red cells, white cells, fibrin, serum, bacteria, and necrotic tissue, all of which constitute the ingredients of an abscess. The changes which I have tried to describe are responsible for the presence of the four cardinal symptoms—heat, redness, swelling, and pain.

The escape of the solid and fluid elements of the blood into the tissues will naturally cause them to swell, and pressure on the sides of the flexible bloodvessels will lessen their caliber. The blood pressure is raised, because an effort is made in each diastolic movement of the heart to drive the normal quantity of blood through these tubes, in the normal amount of time. No provision is made by the heart for the changes which have taken place in the tissue.

We therefore find this condition present—blood rushing through at an increased rate of speed. The velocity of the blood, with the condition of the sides of the vessels, whose elasticity has been interfered with, causes friction. Vasomotor dilatation allows a greater amount of blood to rush to the capillaries and to redden the surface of the part. Heat is produced by the friction referred to before, and also by the excessive amount of blood dispatched to the part. This general disturbance in the tissues will cause pressure upon the sensory nerve-endings and produce pain. The degree of pain is always in proportion to the degree of distention and resistance of the tissues.

It is not necessary to deal specifically with the last symptom, impaired or lost function, because an understanding of the causes which produce heat, redness,

swelling, and pain will naturally involve an equal understanding of the causes of impaired or lost function.

It is now a fact accepted by those competent to judge, that the removal of the cause is the first step in the progressive treatment of disease. Yet members of both the medical and dental professions, whose acts we must perhaps attribute to carelessness, are constantly making exceptions to the rule, and it is for this reason that I desire to present to this body some of the conditions and cases which are constantly coming under my observation.

First we will consider the treatment of abscessed teeth, a pathologic process which I believe is miscalled more often than any other condition which I can recall at this time. How many times do we hear the intelligent but thoughtless practitioner refer to abscessed teeth as ulcerated teeth!—though if requested to define abscess and ulcer, he would promptly reply that an abscess is a circumscribed cavity filled with pus, and that an ulcer is an open granulating sore. Now, if an ulcer is an open granulating sore, how can a tooth become ulcerated?

PATHOLOGY OF ABSCESS FORMATION.

In order to build a foundation on which to base my future remarks, I shall briefly describe what takes place in the tooth and in the surrounding tissues during the formation of an abscess. As the pulp is always the objective part in abscess formation, it will not be necessary to review the numerous causes which may effect an abscessed pulp. Suffice it to say that it is always due, first, to irritation of the pulp. When the blood supply is interrupted or cut off, the pulp ceases to be nourished and a degeneration takes place. All the progressive steps of inflammation which I have described will occur in the pulp, and if not interrupted will terminate in the formation of pus. The tooth becomes a foreign body and the system tries to expel it. The lodgment of the tooth in its bony socket prevents the accomplishment of this end, and we have two opposing forces: First, the system

trying to expel the tooth; and second, the position of the tooth in the jaws preventing this expulsion. Thus we have irritation, the first step of inflammation. Then what happens?

The inflammatory processes repeat themselves in the tissues outside the tooth substance, and the system partially accomplishes its end by loosening the tooth. All abscessed teeth will become loose at some time during the process which I am describing. A breaking down of the surrounding tissues follows, with the formation of more pus in the tissues adjacent to the diseased tooth. Finally, the pus will manifest itself by burrowing in the line of least resistance through these tissues to the outer surface, often breaking through the face and making an ugly wound. Or, by infection, the inflammatory processes will repeat themselves in the body substances, causing necrosis, which often endangers the life of the individual, as in the case which I shall describe. One thing is certain, that as soon as a tooth becomes a foreign body from any cause, nature never does and never will submit to its presence. The action of the system in trying to expel foreign bodies is many times beautifully illustrated in the cases where needles broken in the tissues of the fingers will present themselves later in the tissues of the arm.

THE FALLACY OF WAITING.

If, then, the removal of the cause is the first step in the treatment of inflammatory conditions, why do men persist in advising patients not to have abscessed teeth extracted until the swelling of the face subsides, and in supplementing this advice by stating that the extraction of the tooth would be a very dangerous procedure? Would these same men advise non-interference with a gangrenous appendix until the swelling of the abdomen had subsided? Would they recommend leaving a piece of steel in the eye, a piece of glass in the foot, or a splinter in the hand until the swelling of these parts had subsided? If they would not so advise, why do they do so in cases where a

tooth is involved? If they do recommend postponing the extraction, I believe that I am justified in saying to them that they do not act in accordance with the fundamental principles of pathology, and that therefore they should not assume that responsibility which is associated with the treatment of disease which many times involves a life. Of course I do not recommend the extraction of all abscessed teeth, because many times the skilled dentist, by proper treatment, may prolong their period of usefulness for many years. What I do maintain, however, is that if the tooth is condemned, the swelling of the face or other conditions should not interfere with its removal, and the sooner it is extracted the better.

In the treatment of inflammation we may be required to employ external applications. Shall we advise the application of heat, or cold? Judging by my own experience in both hospital and private practice, I believe that I have seen more damage result from the application of hot poultices to the face than from any other one cause which I can remember. Here, again, I am forced to conclude that the practitioner who advises the application of heat in the first stages of inflammation for the purpose of aborting the abscess formation is not giving his patient the proper treatment, and also that the advice he gives is in conflict with tried and true theory and practice in the treatment of inflammatory conditions.

I stated in the earlier part of this paper that besides the removal of the cause, the removal of any of the cardinal symptoms would be a progressive step in the treatment. I believe that every condition which presents itself in inflammation is dependent on the preceding ones. In the early stages heat seems to be one of the predominating features. I apply ice, therefore, to remove this condition by keeping the parts cool through vaso-constriction, believing that I am limiting, if not entirely checking, the progressive action of the factors producing heat. I am describing the treatment which I would recommend in the

incipient stages of inflammation, before the abscess has formed.

I cannot understand why practitioners apply hot poultices to prevent a condition which is not only made possible by heat, but is greatly aggravated thereby. Heat is one of the cardinal symptoms, one of the conditions we wish to eliminate on account of the important function which it performs in accomplishing that which we are trying to prevent. Basing my method of treatment on my conception of inflammation, I will say that I am satisfied to use ice in all cases except where pus has formed or where the inflammatory process has so far progressed as to make certain the formation of pus, and hence render impossible the abortion of an abscess. If pus has already formed, I use a knife rather than poultices, preferring a clear incision to the ragged wound which is made by pus forcing its way through the tissues and always leaving an ugly scar.

ILLUSTRATIVE CASES.

The following case will show what often may be, and many times is, the result of the treatment which I am condemning:

I was called to see a child five years of age who was suffering from an abscessed deciduous tooth. He had been taken to a dentist for advice some days previously. The dentist told the child's parents that to extract the tooth would be a very dangerous procedure. The tooth was not extracted, and the pain and swelling increased from day to day. The mother finally took the child to a physician for advice. He confirmed the advice already given by the dentist, but supplemented it by telling her to apply hot flaxseed poultices to the child's face. In forty-eight hours the poultices accomplished their end and caused an irreparable injury. The tissues became distorted and the pus finally forced itself through.

The physician continued to treat the child during the next five weeks, at the end of which time the whole of the left maxilla and a portion of the malar bone

were involved by necrosis. I was then asked to see the patient, and found him in the condition just described. Pressure on the face anywhere below the line of the eyes would cause a large quantity of thick pus to flow from the break in the tissues under the eye, also from the nose and from the mouth. I advised an immediate operation, first explaining to the mother the possibilities of such a step in so serious a case.

Two operations were performed on the child. The first consisted in removing a large part of the maxilla from the lateral tooth back to the tuberosity of the maxilla. This section did not extend to the center of the hard palate. The method employed consisted in placing my finger between the teeth and cheek, holding the cheek out of the way while I dissected the cheek from the bone in such a manner that I could pass my finger up by the side of the jaw through the opening under the eye. By so doing I was able to simplify the operation, as well as getting a continuous passage. Irrigation also was made more thorough, and the small particles of necrotic bone, which have the power of re-infecting the parts operated upon, were washed away. At the end of four weeks a second operation was performed, which consisted in the removal of a portion of the malar bone. The child was finally discharged, cured, after having been subjected to two surgical operations and to eight weeks of suffering, all due to the ignorance or carelessness of a member of our profession.

From the observations and conclusions drawn from the study of diseases in our hospitals it has been proved that micro-organisms are the principal cause in nearly every disease known to modern medicine. The pathologic manifestations vary, however, and in some instances we may find that the inflammatory process involves only the first or hyperemic stage, and in others we find manifestations of the last, or suppurative stage. In the oral cavity under these conditions we find caries and necrosis of both the osseous and muscular tissues, while in other cases the kidneys, lungs,

liver, intestines, and the valves of the heart through the lymphatic glands become involved, and in other instances and by other avenues the brain. Indeed, it is beyond the capacity of the human mind to determine just when these minute forms of life cease to invade, cease to change physiologic to pathologic conditions, health to disease, life to death.

DEATHS FOLLOWING INFECTIONS OF THE MOUTH.

During the sixteenth century, Vulpian in his writings states that disfiguration and death are the result of toothache, and reports the death of Gosvin Halt, the Amsterdam physician who had his gum lanced to permit the eruption of a molar. Subsequently the gum became swollen, insomnia and delirium followed, until finally death relieved him of his sufferings. This condition is what today we should probably call septicemia, due either to the micro-organisms being introduced into the system from unclean instruments or to the instruments making an avenue through which the micro-organisms already present in the mouth entered the system.

Zakhavevitsch reports the death of two healthy physicians, one from osteomyelitis, six days after the extraction of a lower left second molar, and the other from peritonitis and osteitis. The first stage in the process of disease in each of these cases furnished also conclusive evidence that the infection was caused by unclean instruments. Banner reports many cases, among them one of special interest, namely, that of a student, age twenty-four years, who made a visit to a physician for the purpose of having a molar extracted. The physician broke the tooth in the attempt, and during the next twenty-four hours swelling ensued. Finally the periosteum became involved, and necrosis followed. The necrotic area was removed fourteen days afterward; swelling continued, there were chills, great debility, rapid and marked excursions of temperature, and pyemia; finally the right lung became involved with pus, and the patient died.

Delester reports several cases in which the inflammatory process spread to the brain, and the patient died from meningitis.

The following reports of cases from my own practice may be of some interest:

On December 4th, C. N., a girl, age seven, was referred to me by her physician. She was suffering from neuralgia involving the right side of the head, inability to sleep, loss of appetite, etc.

History. On November 30th she came home from school complaining of headache, with slight swelling of the right side of the face. Dr. H. was called, and found the child with a temperature of 105° F., with other symptoms which would suggest that she was in the first stages of some one of the exanthematous diseases. He prescribed, and visited the child on the next day expecting to find his diagnosis verified, but on the contrary the swelling had increased somewhat, with a drop of two degrees in the temperature. Examination of the throat revealed nothing to the experienced eye of this physician. He continued to visit the child for the next five days, keeping her as comfortable as possible, but was unable to diminish the temperature more than one degree. The temperature remained at 102° during this time.

Examination. When I saw the patient she had a temperature of 102° F., with the other symptoms previously described. Her mouth seemed to be in a healthy condition with the exception of two or three badly decayed teeth distributed over the mouth. The child could not give the exact location of pain. In the right maxilla all the teeth were present, including a newly erupted first molar, which was apparently healthy as far as visual and instrumental examination could determine. Anterior to this was the second deciduous molar, decayed, although the caries did not involve the pulp. The condition was such as one generally sees in the mouths of children when caries seems to have stopped, not unlike the teeth of tobacco-chewers. There was no pain associated with the examination of the decayed tooth, not even on pressure. There was, however, slight pain when percussion was employed on the permanent molar.

Treatment. I finally decided to extract the permanent tooth, to the great disappointment of the parents, who thought that if any tooth should be extracted it should be the decayed one. Examination of the permanent molar showed unmistakable signs that my diag-

nosis was correct. Abscesses of about the size of small peas were found at the ends of the roots. All other parts of the tooth were normal, having no cavity, not even the small fissure cavity that is present in very many first permanent molars. The child made a rapid recovery. Her temperature became normal within twenty-four hours.

I shall now report one of many cases by which I hope to show the importance of the lower third molars in the production of disease:

On April 6th, L. M. manifested the following symptoms: Severe neuralgic pains, loss of appetite, sleeplessness caused by the pain, finally swelling of the right side of the face, sore throat, and interference with the motion of the jaw, followed by fever and chills. On the second day a physician was called, who evidently decided that the patient had some tonsillar infection. He increased the man's suffering by making an incision through one of the tonsils. After three days the patient discharged this physician and called in another, who found him with the described conditions aggravated and a temperature of 104°. He immediately had the man transferred to a private hospital, where on examination he found a lower third molar badly decayed, which he immediately extracted without breaking, a large amount of pus following. The patient experienced relief, his temperature dropped on Thursday, April 9th. The man's condition remained about the same, swollen face, etc., until 3 o'clock in the morning of April 10th, when the patient was attacked by chills, followed by a rise in temperature of two degrees. I reached the hospital at 2 P.M.

Examination. The face was badly swollen, the swelling involving the sublingual and submaxillary glands, neck, temporal region, and ear. The patient was unable to open his mouth and was suffering intense pain. The tissues were swollen to such an extent that they were very hard, and it was impossible to get fluctuation. An incision had been made near the angle of the mandible internally before I arrived, yet nothing but blood issued from the wound. I introduced a probe into the socket whence the tooth had been extracted, but was unable to find any pus.

Treatment. I advised immediate operation, and the patient was etherized. The mouth was forced open with a mouth-prop; then, with a periosteal dissector, I freed the muscles from the bone extending from the angle to the first molar and down to the in-

ferior border of the bone. The pus, which was deep-seated, now began to evacuate itself, until about four ounces was discharged. I then curetted the tissues forming the inside of the cavity, which was as large as a hen's egg, washed it thoroughly with a weak antiseptic solution, and packed the cavity with sterilized gauze. I dressed the wound each day, and at the end of three days referred the patient back to his attending physician, under whose care he made a full recovery.

In conclusion, let me state that I have tried to point out briefly the importance of a thorough understanding of the pathology of disease. I hope that I have accomplished my aim, and if only one person in this audience has learned just one thing which will render his understanding of disease more complete, I shall feel that my visit to your city has been profitable to me.

MANIPULATION OF ROOT-CANALS AND A SYSTEM OF TECHNIQUE.

By **RICHARD L. SIMPSON, A.M., D.D.S., Richmond, Va.**

(Read before the District of Columbia Dental Society.)

DENTISTRY has made wonderful progress along nearly all lines, but to her shame the rank and file of her practitioners do not or cannot properly treat and fill root-canals. There is nothing in dental practice of so great importance as the complete removal of canal contents. It is high time, therefore, that in order to maintain the honor of American dentistry, root-canal manipulation should be as skilfully and as successfully done as are other operations.

No sane architect would build an expensive house on a defective foundation. Some of our most extensive operations, especially crown and bridge work, are placed on so-called dead teeth. How necessary, then, it is that these teeth have their canals properly treated and filled. This cannot be done unless they are properly manipulated. Who has not dreaded the attempt at opening up the buccal canals of an upper molar or the mesial ones of a lower? One dentist of reputation in my city denies that lower molars have more than two canals, yet in the vast majority of cases two mesial canals can be opened in the lower and two buccal ones in the upper, and can be suc-

cessfully filled. They are certainly there, as abscesses abundantly bear testimony.

The writer has had such positive and successful results from the method about to be described that he gives it, with the hope that it may relieve the mental anxiety of others as it has done his, to say nothing of the patients.

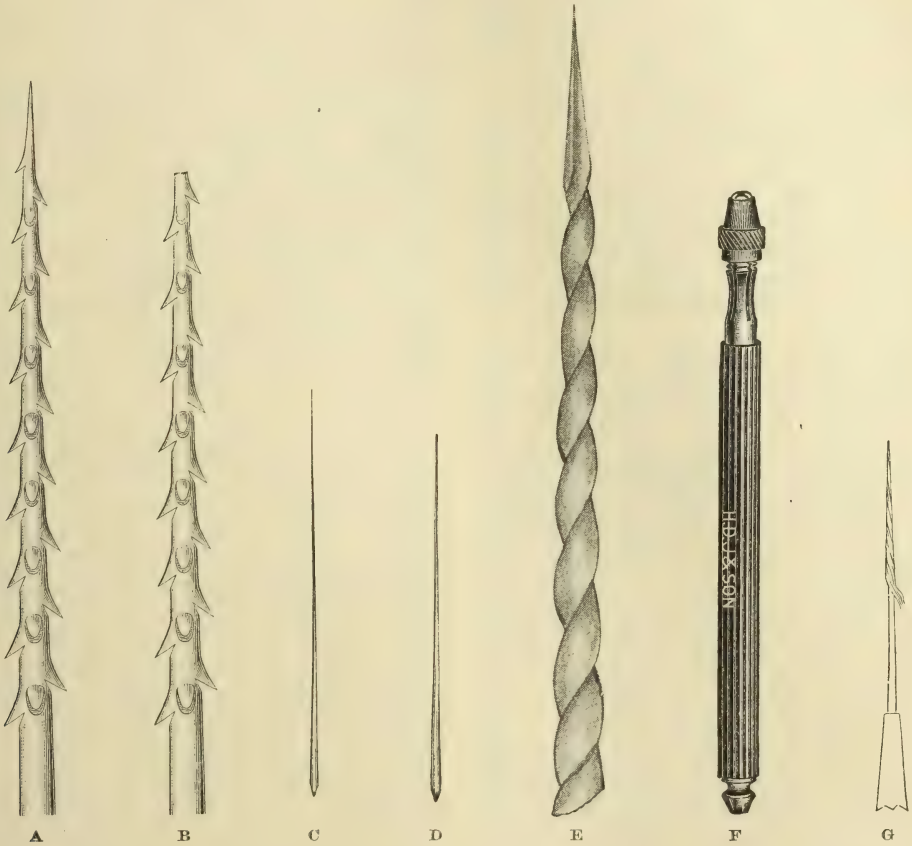
In the first place, the operator must realize that this work cannot be done in a hurry; he must operate with calmness and patience, assured by the knowledge that sufficient compensation will be received to justify this difficult and delicate work. And right here be it known that there is no operation performed by any general surgeon or specialist that excels this one in delicacy and skill. At the same time, experience will enable one to properly open up, medicate, and fill the three canals of most molars in an hour. Usually, however, canals are not filled at the first appointment, but so positive is this method that putrescent canals rarely require more than one treatment.

The instruments required are shown in Figs. A, B, C, D, and E, and their description should be carefully read in order to

enable the reader to follow out the technique.

Fig. A is a Donaldson or similar barbed broach. "Extra fine" is the size mostly used for enlarging canals and removing débris. Special care must be used in

Fig. B shows the same broach with the point broken off. In this condition a broach is worthless for entering or enlarging canals. The blunt end acts as a plugger and packs débris toward the apex instead of bringing it out. It is crim-



A, Extra-fine Donaldson canal cleanser, enlarged ten times. B, Same. Point broken off at the first barb. C, Smooth tapering slender explorer, made by filing down the broach in Fig. B. D, Explorer in Fig. C, with a tiny end-piece cut off. E, Fellowship medium twist broach enlarged ten times. F, All-metal broach-holder. G, Fellowship medium twist broach with cotton for large canals.

the selection of this broach. Notice the tapering point with a series of barbs extending almost to the end. Most makes are worthless, because their ends are not pointed and their barbs do not extend far enough to the end of their point. Select your broaches by the use of a magnifying glass.

inal economy to try to use them. They are saved, however, for making explorers—as represented in Figs. C and D.

Fig. C is a smooth, tapering, slender explorer, made by filing down the broach illustrated in Fig. B. Notice the sharp point. To make this point, put the broken broach into a holder and place it

on a piece of wood or a cement slab. Use a finely cut flat plate-file, and push it repeatedly toward the point of the broach, at the same time turning the holder back and forth. This gives a round, tapering, slender explorer. When the point is not as sharp as desired, you can make it so by holding the broach in the fingers near the point and filing it toward the point on all sides. Any degree of fineness can be secured, so that the explorer will enter even the smallest canals.

The instrument in Fig. D is made by cutting off a tiny piece of the end of the explorer in Fig. C. Notice its bluntness. It is used for carrying cotton into the canal, which absorbs the contents of the canal, and like a wash-rag cleans it out better than anything. You must make these instruments small enough and often enough.

Fig. E is a Fellowship twist broach. "Medium" is the only size necessary, and its use will be explained later on. All canal instruments are best held in an all-metal holder as illustrated in Fig. F. The chuck part is of steel to resist wear, and does not become loose in the handle. Its shortness enables one to grasp it in any position.

For the sake of clearness, we shall describe the method of treating a lower molar. The dam having been put in place, the tooth is so prepared by burs as to afford access to the canals. Very often a constriction is found just at the point where the pulp-chamber merges into each canal, giving one an impression that the canal is smaller than it really is. Remove this constriction with a small bur or a medium size twist broach (Fig. E). Usually the distal canal gives us no trouble. The mesial canals are usually so small that they cannot be entered by a barbed broach. The instrument represented in Fig. C is dipped into your favorite antiseptic, gently pushed into the canal as far as it will go, and left there. The pulp-chamber about the orifice is flooded with the antiseptic. By removing the instrument (Fig. C) a vacuum is formed in the canal, whereby the antiseptic is sucked in. Capillary attraction also assists. The canal contents

are thus sterilized at the beginning, which is most important in case a broach is broken, as well as for preventing infection. When the instrument (Fig. C) is removed, it will retain the curve of the root, thereby materially assisting you, because you thus know in which direction to go. This preliminary probing also gives you a definite measure of the length of the canal. Later on you may want to know if you have gone far enough. With the broach (Fig. A) you proceed to enlarge the canal by means of an in-and-out motion. This motion must not be vigorous enough to bend the broach, nor must any effort be made to push the broach in very far. The movement is one of inserting and partially withdrawing, and can be done rapidly. Enlargement is more necessary than depth at this stage of the work. The broach must not be twisted or screwed in, as this causes it to become fastened in the canal and to break off. The barbs on the broach are so made as to cut by a pulling motion, and a little more force should be applied in withdrawing than in inserting, and delicacy here is most necessary. It is also most necessary that the canal be kept flooded with the antiseptic, which, being a liquid, acts as a lubricant, just as oil or soapy water assists a drill in cutting iron.

It is the author's opinion that the advocates of the sulfuric acid (Callahan's) method derive benefit only from the acid acting as a lubricant and antiseptic. If the acid helps to soften the canal-walls at all, it must also do damage to the coronal part of the tooth, to say nothing of linens, carpets, and dresses. These advocates are also deceived in thinking that the canal is being greatly enlarged, while in reality the broach is being made smaller by the acid and by wear. To prove this: A new extra-fine broach is 30 gage. After it has been used with acid, it is 33 gage or even smaller, and is more easily broken owing to its having been etched by the acid. For this reason a used broach will more readily enter difficult canals than a new one, provided that its point is not broken off. The mental effect lends these operators courage and gives them confidence.

When the canal contents become milky from *débris*, blow them out with a chip-blower, and also absorb them by shreds of cotton wound around the instrument in Fig. D. Re-flood the canal and repeat the enlarging and absorbing, until the apex is reached. When it seems difficult or impossible to go forward at any stage of the work, push in the explorer (Fig. C), and in doing so reopen the canal and admit the antiseptic. This explorer really enlarges the canal by compressing the walls. Then proceed as before. Miller has shown and experience teaches that infection occurs through the apex alone. How necessary it is, then, that this gateway be made clean and kept clean. If any shreds of *débris* are left in the canal, they are packed into the apex when the canal filling is introduced, and thus the apex is filled with *débris* instead of with a proper canal filling.

To the author's mind the most important part of all the work is the proper absorbing of the milky canal contents. It would be as well to leave these in their original condition and sterilize them, as to chop them up with antiseptic and leave them. We must remove all *débris* and fill the canals so as to prevent subsequent infection. We hear a great deal about paper points for absorbing and drying. No paper point can be made small enough and stiff enough to enter these fine canals. There is no need for wasting time and broaches and running the risk of perforations in making the canals very large, since by this technique even small canals can be easily cleaned and dried.

The explorer in Fig. C simply will not carry cotton, because its point is sharp and punches through, leaving the cotton at the orifice. It is a probe, and must be used as such.

The broach in Fig. A must not have cotton put on it, as it is too large, and it is too hard to remove the cotton. We must have something on which cotton can be quickly placed, and from which it can be as quickly removed.

The instrument in Fig. D is a cotton carrier, its end being blunt, and if it

pushes through the cotton, it is because its end has become rounded or sharp. Restore it to its bluntness by cutting off a tiny portion with shears. It is emphasized again that this broach (Fig. D) must be small and slender. You must know how to roll cotton on it; you simply cannot do so if it is crooked. To straighten it, pull it between the thumb and finger, or across the end of the thumb-nail and finger. Then take a shred of cotton (be sure that it is small enough) between the thumb and finger of the left hand; place the broach (Fig. D) on cotton so that just a trace of cotton will extend beyond the end; let the broach-holder lie in the open right hand so that the holder may turn as the cotton is rolled on to the broach. Before the cotton is rolled as tightly as you desire it, fold over the projecting end and roll it to place. This folding over imparts an end to the cotton, and prevents the broach from being forced through as it is gently pushed to the end of the canal.

Fig. G shows the cotton rolled for large canals. To get the full absorbent and wash-rag effect, the cotton is pushed into the canal to the apex and gently packed into the canal by pulling the broach out a little way and pushing it back. This out-and-in movement repeated will make the cotton seem to crawl in (the blunt end of the broach does it). When this same cotton is gently twisted out by means of an old barbed or twist broach, you have a mechanically clean canal, an ideal condition for medication. For this medication roll cotton on the broach (Fig. D), dip it into an antiseptic, and by the above manipulation leave it in the canal. It is usually necessary to use several pieces of cotton to thoroughly clean and dry the canal. To prove the value of this method of using the cotton, clean out any canal by any other process, then flood it with a liquid, and try cotton. You will be surprised to see the *débris* which will come away. This method is invaluable for stopping any flow of blood and absorbing it.

Good barbed broaches (Fig. A) do not have barbs up to the very end. The point is made tapering purposely to act

as a probe, leading the barbed part into the canal. When the apex is reached, some débris still remains between the end of the broach (Fig. A) and the first barb. This débris is removed by means of a Fellowship twist broach, medium size (Fig. E), this broach being a sharp-pointed triangular tapering wire, which enables us to ream out the last remnant. No other twist broach on the market gives as positive results, with the possible exception of the recently introduced Kerr broach. These twist broaches are a great help and may be used often alternately in place of barbed ones. They can be used by twisting, as their name implies, but they must often be removed, and the débris must be wiped off by untwisting them on a cloth pinched around them by the thumb and finger. Too vigorous twisting or failure to remove and clean often will result in breaking off the broach in the canal, from which it is nearly impossible to remove it. These

broaches can also be used in the same way as barbed ones are used for very quickly enlarging canals. "Small" twist broaches do not seem to be of any use at all, as they will not enter small canals.

The instruments illustrated in Figs. C and D are quickly and easily made, and one should not jeopard the success of the work by trying to use those that are too large.

If the canals are inaccessible, it may be best to bend the broaches, but the broach in Fig. D must always be straightened before cotton is again rolled upon it. Standing to the left of the patient will greatly facilitate the opening of lower canals, on either side, and will also allow the operator to use straighter broaches.

The best canal pluggers are made by cutting off the barbed part of broken Donaldson broaches; the point of the pluggers for most cases should be 29 or 30 gage.

PROCEEDINGS OF SOCIETIES.

NATIONAL DENTAL ASSOCIATION.

Thirteenth Annual Meeting, Birmingham, Ala., March 30 to April 2,
1909.

SECTION I: Prosthetic Dentistry, Crown and Bridge Work, Orthodontia, Metallurgy, Chemistry, and Allied Subjects.

Chairman—H. E. KELSEY, Baltimore, Md.

Secretary—J. S. SPURGEON, Hillsboro, N. C.

(Continued from page 977.)

THURSDAY—*Second Session.*

The second meeting of Section I was called to order on Thursday evening, April 1st, at 8.30 o'clock, by Dr. W. G. Ebersole, Cleveland, Ohio.

The first order of business was the reading of the paper by Dr. J. CLARENCE GRIEVES, Baltimore, Md., entitled, "The Behavior of Certain Metals in the Mouth."

[This paper is printed in full at page 1041 of the present issue of the COSMOS.]

Discussion.

Dr. B. HOLLY SMITH, Baltimore, Md. I should very much prefer to discuss the essayist than to discuss his paper. I was struck with the rather familiar way in which he called for the higher power and seemed to obtain it. I confess to no such familiarity with this higher power.

I am deeply interested in the subject of the disintegration of metals in the mouth, and I should deem it a rare privilege to have read the paper in the presence of Dr. Black, who knows perhaps more than any other man in this room about the behavior of metals in

the compositions which we have presented to us as filling materials—he can help us, no doubt, to solve some of the complex problems involved. A little experience in the laboratory—where I had left a bottle of sulfuric acid un-stopped, exposing some German silver to its fumes, which entirely changed the character of the metal, rendering it brittle—impressed me with the possibility of deteriorating influences of the oral environments on metals; not that we could have the fumes of sulfuric acid in any such concentrated form, but we know the influence of hydrochloric acid, which may be erupted from the stomach, affecting the metal used in the mouth. These observations give us a warning as to the advisability of using some of the base and low-fusing metals in appliances or fillings.

I confess to you that I am not capable of discussing this paper. I am not a metallurgist nor a chemist, and there are many subjects that I should prefer to discuss, such as, for instance, Dr. Noel's paper. But Dr. Grieves' paper shows us that he and the others who are interested in this subject are trying to enable us to do better service for our pa-

tients than heretofore. It has not been uncommon practice in using porcelain teeth to set posts of German silver in zinc oxyphosphate, without a knowledge of the fact that the phosphoric acid would in a very little while destroy the posts. Unquestionably these defects, microscopic though they be, present a serious menace to the health of our patients. The salts produced by the disintegration of the metals enter into the alimentary tract and possibly have a deleterious influence upon the nutritive organs of the human body. I congratulate this association that this subject has been given serious consideration by one whom I know to be careful in what he says and conscientious in what he does.

I should like to hear Dr. Black discuss this paper, although I do not wish to put him ahead of our friend Dr. Head.

Dr. JOSEPH HEAD, Philadelphia, Pa. When our friend Dr. Smith speaks we all sit up and listen, and when he says what is true we all believe it, and even when he says what is not true we all wish it were so and half believe it. When he spoke concerning the grave danger of cementing German silver posts with zinc oxyphosphate, I confess that while I listened while he gave us most excellent reasons why the posts should deteriorate in a short while, I almost forgot that I had been setting these posts in zinc oxyphosphate for many years, and that many of them are now in position in the mouth. Still, I shall be cautious in doing it in the future. I have been reminded of the incident of the man who, when the locomotive first came into use, said that its real value would be greatly crippled, because he had worked it out with the utmost scientific accuracy that if a man traveled through the air at a speed greater than fifteen miles an hour, he would lose his breath and perish. It is similar with a great deal of our scientific work. We can give most excellent theories for anything under heaven, but every scientific experiment should be verified by accurate observation in the mouth, because the mouth observation is the final ultimate scientific test. We lead up to mouth experimentation as best we can by our lab-

oratory work, difficult though it be, but we should always remember that in our laboratory work we are preparing for the great final arbitration of what we really find in the mouth, and I think that should be the keynote of all scientific work.

I can only most heartily commend this very excellent paper of Dr. Grieves on the deterioration by electrolysis. A great deal of his work will lead to far greater development in the future, and I hope that he will carry it on as he has begun it. I most heartily appreciate that he has not tried to explain the equation that we have in the mouth, where there are about ninety-eight unknown to any two known quantities. Often when the complicated processes of metabolism are explained by simple organic chemistry, we find that while the explanation is simple in the extreme, there is only one chance in a million, perhaps, of its being right. The great feature of Dr. Grieves' paper is that he has preferred to give the scientific data in a clear, concise, simple way, explaining what he could reasonably explain, and leaving the rest for the future to unravel. I have the greatest admiration and praise for the author, and hope that his paper may help to stimulate more scientific work of a similar character.

The case cited in the essayist's paper which interested me most was that of a mouth in which he found that there was something which attacked the pure gold as well as the tooth-structure. Of course we all know that some of the base metals are very harmful if they are swallowed, but I should think that the patient in whose mouth gold fillings dissolved would at least not need the gold cure. It is strange that anything at all should be left in such a mouth, but I cannot help feeling that a great deal of that deterioration and wearing away of the gold may have been due to friction, even of precipitated chalk. Until the contrary is proved I should be strongly inclined to believe that the gold disappeared more from the friction of the tooth-brush. The tests Miller and a number of others have made in this direction show that while the

tooth-brush applied with pure water has very little action, precipitated chalk will have a very decided effect. We all know from our laboratory work that precipitated, not the ordinary chalk, if applied on the brush wheel will rapidly wear away pure gold. There may be an acid in the mouth that attacks pure gold, but if that is the case, its presence is one of the most incomprehensible problems that have yet been presented to us. I also noticed that the front teeth were greatly affected and the molars not at all. Why should this electrolysis leave out the molars? In my opinion it is much more likely that these conditions arise as a result of the decalcifying action of food-stuff seconded by tooth-brush friction, its effect on the front teeth standing in direct ratio to the decalcifying action of the foodstuff on the teeth. I should feel very much inclined to ask such patients if they are in the habit of sucking lemons or oranges or other acid fruits, for it is well known that the fruit acids will soften the enamel so that very slight friction of the tooth-brush will wear it away with astonishing rapidity.

I cannot believe that Dr. Grieves' investigations entitle us to assume that there is in the mouth an acid strong enough to attack pure gold. I do not think that it is proved that electrolysis wears away the enamel and the tooth-structure. It must be at least the presence of decalcifying foodstuffs, perhaps together with the presence of decalcifying saliva, tooth-brush friction, and precipitated chalk, which produces just such a condition as the essayist has so scientifically and most excellently presented to us tonight.

Dr. G. V. BLACK, Chicago, Ill. It is with some hesitation that I respond when asked to talk about a subject in which we have so many conflicting data. We know very little about alloys. There are some phases about the metals, the most sensitive of all the elements, that we seem not to be able to understand. When I work with metals it seems to me that they are living entities; when they are pure they do certain things over and over again with an exactness that cannot be expected

of any other elements, but when we turn them loose and let them run riot, mixing them with each other and with other elements, we never know what to expect. I have long been impressed with this, and hesitate to talk of the metals unless I can single them out, or pair certain ones together.

Pure gold cannot be dissolved in the mouth. Dr. Miller announced that his gold fillings were worn away by erosion just the same as the tooth material, by the tooth-brush and abrasive powder, as he supposed. I had been trying to stop erosion by gold fillings; the erosion would go on beside the fillings and leave the margins of the fillings standing there perfectly shaped without a trace of erosion. That went on for years, and I had never observed anything else. But some time ago I met a dentist whose teeth were badly eroded, and who had gold crowns put on because his teeth were so exceedingly sensitive. On one of these teeth the crown had been cut through; another crown had been put on and that was cut through, and a third crown had been put on, and that was also cut through. The patient maintained that no abrasive tooth-powder whatever was used in brushing his teeth. I would compare this with another observation: A gentleman of my acquaintance has a class of patients practically all of whom have erosion. I questioned one of his patients about the use of the tooth-brush, and he replied that he brushed his teeth three times every day, and brushed them well. Another dentist was examining that patient's mouth at that time, and saw the operator make a cross-mark with a chisel on the buccal surface of a molar that was thickly covered with filth. He called my attention to this, and four days afterward that cross-mark was still showing in that mouth.

Dr. HEAD. Was there erosion on that molar?

Dr. BLACK. No, sir.

Dr. HEAD. So that shows that friction did not act on that molar.

Dr. BLACK. That may be. We have so-called erosion by friction, undoubtedly due to abrasive tooth-powders. But

we also have erosion though the patient does not brush his teeth. This can surely not be due to friction. There are a good many questions about erosion that I am in doubt about, but some of the horizontal lines that run across the teeth are in my opinion due to the tooth-brush and abrasive powders. I looked over Dr. Miller's work in his laboratory during his experiments on the artificial production of erosion, and I must say that if he had shown me these as cases of erosion that had occurred in the mouth, I would not have thought of questioning the correctness of his statement. But they are not of the character of many of the erosions which I have seen in the mouth. The characteristic cup-shaped erosions which we see in the mouth were produced artificially by fluids in motion, but we never observe such rapid motion in the mouth.

We have heard tonight a good deal about electrolysis, much of which is not electrolysis at all. If we take ordinary crystal gold such as Watts', place it on a tray, stick a pin through it and let it stand, the pin will fall off. It will be corroded at the surface of the gold, and will do so over and over again, though varying considerably in time in different trials. That is explained by the fact that the gold attracts acid gases and forms acid salts in its pores, and just where the pin comes to the air it will be corroded and fall off. This may be observed over and over again. We can analyze that which the gold has attracted from the atmosphere, if it is not too complex; sometimes it is so complex that it puzzles the best investigator. I do not know whether the gold fillings that were presented here tonight have been cut away by any acid in the mouth. You find this condition, however, quite commonly, and it is well to remember that we are very easily deceived in this respect, although the patient may have no intention of making false statements.

There is a great deal of misconception about amalgams. I have not been able to speak plainly enough to be well understood, and some phases have come up that have been overlooked in my early investigations and need to be corrected.

I cannot understand why very many alloy makers insist on using two or three modifying metals in alloys while they should use but one, using metals that are incompatible with each other. Why should we mix our solders with zinc? Why should men want to place amalgam in a cavity and put gold over it? Why mix gold and tin? These metals are incompatible and will not work well together, and will destroy each other. If you take a block of silver of an inch square, rest it upon a block of tin of an inch square and put twenty-five pounds of pressure on it, you will find that the tin goes through the silver in a short time, and changes the character of the block. This shows that tin and silver have a very strong affinity for each other. But why mix gold with amalgam alloys? Gold will not harden in mercury. And you cannot make an amalgam of gold and platinum, so why put in these substances that will only cause trouble?

When studying amalgam alloys I asked the alloy makers to send me their alloys in ingots for examination. I laid these ingots on a piece of metal with a piece of tin beside them, and heated them up in such a way that the alloy and the tin received equal heat. I watched them until the tin had just begun to melt, then I took up the alloy with the tongs and knocked it on the table, and obtained globules of tin as big as a buckshot that had never been alloyed at all. Not half the alloys on the market at that time were true alloys; they were simply mixtures. There is a difference between an alloy and a mixture. In alloy-making an alloy is one thing, and a mixture is another thing entirely. You may take a conglomeration or mixture of tin, gold, platinum, and what not, throw them into a crucible, and from this form an amalgam, and you will get such results as depicted; but if you take a silver and tin amalgam made from an alloy dependable results can be had, and you can always know when you have an alloy, if you are accurate enough in the weighing, because the alloy of silver and tin will always result in a condensation which will give you a higher specific gravity.

This has been denied recently by some German investigators, but they have made the denial purely upon theoretical grounds, and I demand that they prove it by actual alloying and weighing.

Dr. E. A. BRYANT, Washington, D. C. I wish to say that in two cases I have met the very conditions which Dr. Grieves has brought before us in the last case cited. Not only was the pure gold disintegrated under these conditions, but an entire mouthful of crowns was simply wiped out, as Dr. Grieves has shown in his case. It seems to me that we have there the same conditions that are met with in depositing metal electrically. Dr. Head and Dr. Black have said that pure gold could not possibly be so dissolved, but I have seen several of these cases, and one of them is now living and in the hands of one of the leading dentists in Washington.

Dr. HEAD. I wish to add a remark on the deterioration of German silver in zinc oxyphosphate, about which my esteemed friend Dr. Black spoke. I can readily imagine that German silver would be deteriorated by the fluid oxyphosphate, and I have never questioned that, but when that mixture becomes set, it is inert and does not affect the German silver.

Dr. SMITH. When you set the pin in the oxyphosphate, it is in a fluid state.

Dr. HEAD. Only for a short time, and there is not enough acid left in the zinc oxyphosphate, and not enough time for the fluid to work upon the German silver so as to in any way affect it. As a matter of fact we have again and again taken the pins out immediately after setting them, or within six months, if we could get them out, and have found them to adhere firmly. If there had been any deterioration of the metal on the surface, the pin would have become loose. While Dr. Black may have seen these various phenomena, I have seen green teeth that did not have any German-silver pins in them; it may be that he has seen pink or sky-blue teeth, still he or I would not attribute that to German silver.

Dr. L. E. CUSTER, Dayton, Ohio. I have worked with German silver, plat-

inoid, and metals of the higher melting-point, also with pure nickel. You may take a piece of German silver, which today is as fine as any metal you may wish to use in practice, and lay it away for six months, then bend it, and find that it has become brittle. This is because it is an alloy. Nickel as we ordinarily find it has a melting-point in the neighborhood of 2700° F. If pure nickel is used for regulating appliances instead of German silver all these difficulties which have been spoken of tonight will be overcome. It is not quite as rigid and strong as German silver; it possesses, however, some of the properties of the platinum pin in the Logan crown. Hammering or bending imparts to it a temper. Pure nickel is hard to obtain, and cannot be secured in this country, as far as I know, except from a firm in New York city. From this firm I have been able to obtain absolutely pure nickel, which I use instead of German silver, and if you will use it in your regulating appliances, you will overcome all the trouble about which we have been talking for the last hour.

Dr. H. C. FERRIS, Brooklyn, N. Y. We are indeed to be congratulated upon this essay. This paper could be discussed for two or three days, and then we would have only commenced, as it contains so many discussable statements. I am going to briefly touch the subject from the physiological standpoint. The essayist makes mention of the physiological conditions resulting from the amount of solvent in the German silver being present in the mouth, and the deleterious effects upon the constitutional conditions. We all know that German silver dissolves in the mouth, and we also find that saliva containing the product of this solvent action has a germicidal effect upon the bacteriological product in the saliva. I have made some investigations along this line, Dr. Dexter, a pathologist of Brooklyn, carrying out these experiments for me. He put a band that had been worn in the mouth for two or three weeks into a gelatin culture, and found a negative result after incubation. He took the band again, scraped off the surface, put

the scrapings in a gelatin culture and the band in another gelatin culture, introduced both into the incubator at the same time, and found that the scrapings had developed bacteria, the band none. This can be proved more easily by taking a specimen of saliva from a patient who is wearing German silver bands; you may allow that saliva to stand open for three or four days, and will perceive no odor from that specimen, or comparatively little. If, however, normal saliva from a normal mouth is left standing, in a night and a day it will drive you out of the room. Again, saliva from a patient wearing a regulating appliance may be taken, filtered, dialyzed, mounted on a slide and examined under the microscope, and crystals of copper will be found in it. That proves that in such mouths copper is present, which has a bactericidal action on the saliva.

Dr. GRIEVES (closing the discussion). I am more than honored by Dr. Black's presence and his courtesy in discussing my paper.

I shall not take much time in closing, but would try to clear up a misunderstanding on the part of my friend Dr. Head. I had no idea that electrolysis had anything to do with the dissolving of the gold—I did not know what it was, and I think the paper which we are now going to hear from Dr. Ferris may throw some additional light on this question.

I have worked along this line and have presented this paper, feeling that dentists did not know the environments in which they were working, that they have been putting all kinds of things in mouths and did not know what was going on as the result of this. My thought is that dentists should make tests of the saliva, in the same way as the medical men make tests of the urine. They can do this in most cases, but occasionally they run across a hard case that they will have to send to some laboratory. Just as the medical men are making tests and are finding acetones and different acids in the urine, so we can test the saliva. Dr. Ferris, as chairman of the Committee on Scientific Research, is the man to

tell us about such tests, and I am glad that his paper follows mine.

The next order of business was the Report of the Committee on Scientific Research, by Dr. H. C. FERRIS, Brooklyn, N. Y., chairman, as follows:

REPORT OF COMMITTEE ON SCIENTIFIC RESEARCH.

Your committee has organized, and has taken up the study of "Salivary Analysis," as being the most important subject before the profession at the present time.

To intelligently study the pathological conditions of the oral cavity, we deem it necessary first to determine the normal. To accomplish this aim it is necessary to have more accurate information, together with a more simple and definite technique in the examination of saliva for its physical and chemical properties, in order that one investigator may work in the same field with another. That this may be accomplished a systematic examination of thousands of cases is necessary.

It is the opinion of your committee that the work done to date, from a pathological standpoint, cannot be of scientific value, as the normal constituents of the salivary secretion are unknown. Several chemical analyses have been made by physiological chemists, but comparatively little time has been spent upon this secretion, the importance of which as a factor in diagnosis has but recently become recognized.

In review of the methods used in salivary analysis, your committee are of the opinion that errors in technique are numerous. We have outlined a plan for the systematic study of the subject, in order to secure results that may be uniform and that a definite end may be attained. It will require painstaking work on the part of a number of investigators examining thousands of cases to produce results that can be considered of scientific value.

It is unnecessary to take up your time by relating in detail the extent of the

experiments performed by your committee to attain the present method. Suffice it to say that we have detected errors in the method of determining the specific gravity. There has been no instrument devised for obtaining the specific gravity of the saliva. Findings have been reported lighter or below the specific gravity of water; if this be true, an error in technique remains to be proved.

To accomplish this object we have devised a salivary hydrometer whereby the specific gravity may be ascertained from 0.990 to 1.030, and requiring but a small quantity of the given specimen. The instrument is composed of a glass tube fitted with two compartments, one sealed and the lower one corked. The lower section holds $3\frac{1}{2}$ ccm. of water, the corked one is weighted with mercury so that when floated in distilled water at a temperature of 70° F. the scale in the stem will stand at 1000. Substituting the specimen for the water, one may read the scale, plus or minus. With this instrument one is able to determine the specific gravity of small quantities of saliva which are lighter or heavier than water. Care must be taken to fill the receptacle so that the bottom of the meniscus registers on the line, as the instrument is extremely delicate.

We also found errors in the method of taking the acid and alkaline reactions with litmus paper, and in the ordinary method of titration with phenol-phthalein taken with sodium hydrate, owing to the presence of carbon dioxid.

In order to eliminate this property, a definite quantity of hydrochloric acid was added to the specimen, which was then brought to a boiling-point, so that the acid estimation would be more accurate by the elimination of the CO_2 . This technique is explained in chart No. 1. (See end of report.) For determining extreme alkalinity, 1 per cent. solution of methyl orange may be used as an indicator, titrated with 1/40 normal hydrochloric acid solution.

We suggested to Dr. H. Carlton Smith, professor of chemistry at Harvard Medical College, that he devise for us a more definite scale for the quantitative

analysis for sulfoeyanates, so that the estimation of these properties of saliva be uniform and the findings be intelligible to the scientific world. The instrument which he devised is here illustrated. It affords a fair estimation by color reaction.

The instrument is constructed with a 4 mm. cell cemented in the center of a disk of glass 2 mm. in diameter. The cell is filled with aqua destillata and six definite amounts of potassium sulfoeyanate added, with two drops of ferric chlorid (5 per cent.) as a reagent. Another disk of glass is placed on top of the cell, so as to eliminate all air-bubbles. The color reaction was then painted in oil on the under surface of the upper disk, leaving the center free. By substituting saliva for the aqua and adding your reagent, you compare the color obtained with those found on the disk, which will give you an approximate estimation of the quantity of potassium sulfoeyanate in your specimen. The instrument is practical in high percentages, although it is of limited value in dilute solutions, owing to the limited number of colors on the gage.

Your committee are greatly indebted to Dr. Smith for his assistance.

Your chairman, assisted by Dr. Schradieck of Brooklyn, has devised another scale for this reaction, which is composed of two glass tubes of the same caliber, with white glass backs and with a blue line running through the center.

Tube A is scaled to receive 1 ccm. of the specimen to be examined. Tube B is scaled in multiples of 1 ccm. divided into tenths.

The method of estimation is as follows: In tube A put 1 ccm. of the specimen to be examined. In tube B put 1 ccm. of a standard solution of 1:2000 sulfoeyanate of ammonia, then add two drops from the same pipette of a 5 per cent. solution of ferric chlorid as a reagent. The color struck in tube A will be lighter than that struck in tube B. By adding sterile water to tube B to the second volume you will have reduced this quantity one-half, or 1:4000, and so on. This reduction continues until you match

the shade of reaction in tube A. You will then be able to read from the bottom of the meniscus, in thousandths and ten-thousandths, the quantitative value of sulfocyanate in the specimen. With this instrument one is able to determine quantities up to 1:20,000, but if you dilute your standard solution of sulfocyanate of ammonia one-half, or 1:4000, and proceed as before, you can estimate a quantity of 1:40,000, the instrument being as sensitive as one drop of your color reagent in 1 ccm. of aqua.

The same scale may be used to determine the quantity of ammonia or organic matter, using Nessler's reagent instead of ferric chlorid.

Your committee has adopted this scale for the estimation of these chemicals, until it is proved defective.

The present estimation of ammonia with Nessler's reagent is incorrect, as Nessler's reagent strikes a color with any vegetable or animal matter in solution, epithelial cells, etc.; we have therefore substituted the term "ammonia or organic matter." In this connection your committee are cognizant of the fact that Nessler's reagent varies materially as made by different manufacturers, therefore it is advisable to procure it from the same chemical supply house.

In order to further this object we have devised a set of examination sheets with directions for the technique, making these as simple as possible, so that any careful practitioner may pursue this work. No. I—Method of Technique; No. II—Salivary Record for each patient examined. These records may be procured from the committee.

To further facilitate this method on your part, we have arranged with Eimer & Amend of New York city to construct a salivary analysis set, which will contain a special 5 ccm. burette and stand, 11 tubes each fitted with a rubber-stoppered pipette, a 10 ccm. graduate, a 10 ccm. graduate, corked, with a double scale; a salivary hydrometer, a colorimetric scale for ammonia and sulfocyanate; a glass mixing-rod; a set of beakers; 1 oz. of each of the twelve reagents, and a white porcelain minim ex-

amination slab. These may be procured at an expense of \$17, or fitted in a wooden case with removable sections, \$20.

Your committee wish to call for volunteers to work with us. We should be glad to have the gentlemen interested in this work report their findings in ten cases of normal mouths which show normal reaction in urinary excretion (two examinations to be made, three days apart), and as many cases as possible of pyorrhea alveolaris and interstitial gingivitis, the examinations to be made every three days during treatment. If such reports be furnished to your committee by January 1910, a tabulation of results will be made. We also solicit all the criticism that can be backed by scientific proof, both chemical and physiological, upon this technique, which we consider as being far from perfect, yet as marking an initial step in the scientific consideration of this subject.

In order to emphasize the value of investigation of this character and the interesting results following, we wish to report a case of orthodontia examined under an inferior technique to that which we are presenting, together with a urinary analysis, examinations having been made twice a week for nine months. You will note the changes in time of delivery of the specimen, the specific gravity, the acid index, sulfocyanates, and ammonia or organic matter—all those properties which are recognized as pathological being eliminated with the exception of a trace of albumin, at the end of this report [exhibiting]. The final result you will here see illustrated in the patient.

Such reports as these are being duplicated every day throughout the country, and from our clinical experience we know what must take place. But if we desire to be considered scientific men, it behooves us to prove our work in a scientific manner.

We trust we may be able to interest you gentlemen in this field, so that we may be enabled to determine the normal, and establish a system of diagnosis that will be practical.

HENRY C. FERRIS, *Chairman.*

[I.]

Directions for Making Analysis of Saliva.

(Prepared by the Scientific Committee of the
National Dental Association.)

History of chronic disease:

Description of teeth and mucous membrane:

Character of decay:

(1) *Time of day:* (2) *Time to deliver 20 ccm.:*

Amount:

Consistence: [Sticky, thick, or thin:]

Odor: [Fetid, ammoniacal, resembling garlic, or other peculiar odor:]

Specific gravity: [May be taken with a salivary hydrometer (Eimer & Amend):]

Precipitate: [Whether large or small quantity:]

Test for acid index: Should be ascertained as soon as delivered. Use 1-40 normal sodium hydrate solution in 5 ccm. burette. The degree of acidity is obtained by taking 5 ccm. saliva and adding 2 drops of phenol-phthalein solution, neutral, then drop by drop NaOH (1-40 normal solution sodium hydrate) until a rose color is produced. Having noted on paper the number of ccm. of the NaOH in the burette before and after the rose color is obtained, the number of ccm. displaced multiplied by 20 and divided by 4 (in order to find the number of ccm. NaOH necessary to reduce 100 ccm. saliva) equals the degree of acidity—normal being alkaline.

To attain a more accurate result, add 1 ccm. of 1-10 normal HCl solution and boil to drive off the CO₂; titrate as before and subtract the acid index of HCl from result.

Test for alkalinity: Proceed as above, substituting 1:40 normal HCl for sodium hydrate and methyl orange for phenol-phthalein, and titrate.

Sulfocyanate: Use the colorimetric scale (Eimer & Amend), 1 ccm. of specimen in tube A, 1 ccm. of 1:2000 sulfocyanid ammonia in tube B; add 2 drops of 5 per cent. ferric chlorid to each tube, add aqua destillata until color in B matches that of specimen. Read scale in thousandths and ten-thousandths. Care must be taken to have the bottom of the meniscus on the line.

Ammonia or organic matter: Use colorimetric scale, 1 ccm. of specimen in tube A, 1 ccm. of 1:2000 ammonium chlorid in tube B; then add 2 drops of Nessler's reagent to each tube; reduce the color in tube B with aqua destillata until it matches specimen. Read scale in thousandths and ten-thousandths.

Chlorin: To 4 drops of sample on a white slab add a drop of 5 per cent. solution neutral chromate of potassium (K₂ or O₄). Mix with glass rod and then add a drop of a 1-10 per cent. solution of silver nitrate. If chlorin is present in normal quantities this test will give a reddish precipitate, gradually turning white.

Acetone: In 4 drops of sample dissolve a crystal of potassium carbonate, then add a drop of Gram's reagent. An odor of iodoform indicates acetone. (Care must be taken not to confound the odor of iodoform iodine in Gram's reagent with that of iodoform.) Mount slide and examine with microscope for crystals of iodoform, is best test.

Mucin: Use 10 ccm. of specimen, dilute with equal quantity of aqua, then add 5 drops of glacial acetic acid, and the mucin will separate and can be recorded as Excess, Normal, or Minus.

Albumin: After the mucin has separated, filter, and with the filtrate make the test for albumin. To about one-half a wine-glass of clear saliva add strong nitric acid very slowly, allowing the acid to run down the side of the glass so that it forms a separate layer beneath the saliva. Just above the line of contact note the white line of albumin. Record as Excess, Trace, or Normal.

[II.]

Salivary Analysis.

Name Age
Time Date
History of chronic diseases
Description of teeth and character of caries
Amount of saliva (normal 60 cc. per hour)
Consistence
Odor
Specific gravity (normal 1.002)
Precipitate
Test for Acid index.....Normal.....
Alkaline
Sulfocyanate
Ammonia and organic constituents
Chlorin
Ptyalin or enzymatic value
Acetone
Mucin
Albumin

There being no further business before the section, the Chairman declared Section I adjourned until the next annual meeting of the association.

(To be continued.)

NEW YORK ODONTOLOGICAL SOCIETY.

Monthly Meeting, March 1909.

A REGULAR meeting of the New York Odontological Society was held on Tuesday evening, March 16, 1909, at the Academy of Medicine, No. 17 West 43d street, New York city.

In the absence of the president, the vice-president, Dr. Dills, occupied the chair and called the meeting to order.

INCIDENTS OF OFFICE PRACTICE.

Dr. SAFFORD G. PERRY. For many years I have had an aversion to the cutting away very generally and very liberally of the human teeth. I probably

It does not depend on cement, and it can be put in without cutting the tooth so freely.

At the same time I am a very firm believer in the porcelain filling, and an enthusiastic advocate of the gold inlay under certain conditions.

I wish to show a tooth which I treated in a manner that I have applied many times in the last two years. This is a very badly decayed bicuspid, which was so frail that I did not have the courage to fill it with gold foil in the old way. I did not like to fill it with either of the cements, and I did not want to put



would not be sustained in that idea, because it is believed by many that it is necessary to cut very freely in order to make certain kinds of fillings. I used to do it myself in the earlier days, but now I try to save the tooth-structure whenever I can. One of my objections to the porcelain inlays was the necessity for the very liberal cutting of the teeth, as well as the fact that when the cavity is prepared so that a porcelain inlay can be put in, it is so prepared that the inlay can come out—and we all know that they do come out sometimes. The same holds true with the gold inlay. I many times prefer to work a little longer and weary the patient and myself a little more by putting in an old-fashioned contour filling, such as I made twenty-five or thirty years ago, for I have the feeling that when the filling is in it will stay.

in gutta-percha, because it would have split the tooth before long, and I did not wish to cut the tooth still more to put in a gold or porcelain inlay. I therefore made a sectional inlay of gold, taking the impression in the cavity, shaping the wax while in the cavity so that it could be drawn out, and placing the wax on the buccal side. After making the gold inlay in the usual way I set it with cement, and filled what was left of that cavity with the Standard amalgam. That left the tooth in such a condition that the gold inlay was on the outer side, preventing discoloration, and the amalgam filling on the inner half, next to the tongue, where a little discoloration would not be of importance. The result is shown here rather roughly. The first model shows the preparation of the cavity. The second one shows the gold inlay

in place, and the last one after the gold inlay had been set and the rest of the cavity had been filled with amalgam.

I have made this operation in this way quite a good many times for perhaps two years past. Dr. Prentiss is not here, but he would tell you how many such fillings he has seen in my office, and what his opinion is of them. Two years is a short time to test an operation of this kind, but I have the faith that we can make sectional gold inlays without the necessity of cutting the teeth so greatly, and still restore them so that they become entirely serviceable. In one case a tooth was so badly decayed that a good part of the inner cusp was gone. An inlay was placed under the outer portion, then a gold inlay that went into the depths of the root of the tooth, entirely restoring the shape of the latter. I saw that filling a year afterward, and although it had to bear the hardest strain of mastication, there was no sign of "give" or weakness in any part of it. I do not think that tooth could have been restored in any other way. On the exterior side it represents a perfect tooth, because of the gold inlay being set with the cement.

The paper of the evening was then read by Dr. MARCUS L. WARD, Detroit, Mich., his subject being, "A Consideration of the Casting Process, with Special Reference to Refractory Metals."

[This paper is printed in full at page 1052 of the present issue of the COSMOS.]

Discussion.

Dr. VAN WOERT. I have been very much interested in the reading of the paper, as I was in looking over it before I came here. Few of us appreciate the great amount of labor expended on these investigations. It is probable that you have all read the investigations of Dr. Price, and the deductions made as noted in the three articles printed in the *Items of Interest*. I personally have never been able to give the time necessary for that particular sort of investigation, and have been obliged to rely on the work of others.

I cannot believe that there is so much intricate matter that is going to hold us up on this work that we cannot go on with the data which we have today. I do not mean to depreciate the ideal cast gold filling, nor the ideal investment, but I believe that we have at hand today investments that make it practicable to produce satisfactory results.

I had the pleasure of visiting Dr. Taggart some three weeks ago at his office in Chicago, and he demonstrated to me a new investment that seemed to me to be almost perfect. I had hoped to bring some of it home with me, but could not do so, but I have since received a small package of it. I immediately put it into practical use, and this afternoon I made a test cast in a model which I have used for a year and a half for the purpose of testing investing materials as they come to my notice.

As the essayist has stated, the shrinkage of both investing material and gold is so minute that in a small filling it is hardly perceptible, if at all, to the naked eye; to overcome that, and to have something approximating the form of filling which we are making, I prepared a cavity in a large porcelain tooth. Some of you have seen the tooth model before, but not the casting. The casting was made this afternoon, and it is just as it came from the investing material. I will pass it around for you to detect the shrinkage, if you can. There is shrinkage, but very little. This leads me to believe that a material of that quality is reliable enough for our present need.

I do not wish to depreciate the labor expended on this investigation, but I want the young men in particular, who are rather skeptical as to the cast gold filling, to know that there is a means by which they can go on with their work, and that there are men of the type of the essayist tonight who will make scientific investigations for the good of all of us. It is not within the province of all to make these investigations, and we must depend on certain members of the profession to do it for us, while we, as a body, must accept the best results of the majority of them.

I think the method as propounded by Dr. Price is so intricate—there are so many contradictory procedures to it—that it almost makes it impossible for one to use it. It has been contended that the direct method for inlays is the most reliable. Personally, I believed that for a long time, but I do not today. Dr. Price goes further, and makes an impression for a cavity by taking an impression of all the adjoining teeth. That does not seem practical to me, if I understand his method correctly, and I think I do, for I saw the models which he sent here, and read his paper, which was sent to Dr. Ottolengui, who presented it. I think one of his strong points is that if he gets an impression of the cavity or tooth and the adjoining teeth, he can better proportion his filling, and he casts directly into that material.

The impression method in my opinion is the lesser of two evils, and the reason why I speak of that is because it has to do very largely with the result of the filling when cast. I think it was Dr. Black, some fifteen or twenty years ago, in speaking of investigations with amalgam, who decided that the shrinkage of amalgam was 0.0001 of an inch as the average. That, together with the shrinkage of the investment as given by the essayist, would seem to counterbalance, so I have found that fillings made from amalgam dies go to place very much easier than those made directly, because of the very condition the essayist has described, namely, that the investing material does shrink, therefore the filling is larger than the wax model.

There is another statement in the paper that I would like to have a little more clearly defined. There seems to be a considerable controversy as to whether castings should be made in a hot or a cold mold. I am discussing this matter on clinical experience, and not upon scientific investigations such as the essayist has made. My experience has been that I obtain better results when casting to a hot mold; not a red-hot mold, but I put the flask on the dryer, dry it as quickly as possible, take it from the

flame, put the button of gold into the crucible hot, heat it with the blowpipe before placing it in the machine, and cast immediately. I may be wrong, but I never have been able to get the same results with a cold mold as I have obtained with those that were treated in the way mentioned.

As to the pressure required for casting gold fillings, that is a question of individuality, I believe. I have seen some of the most beautiful results with as high as thirty or thirty-five pounds, and I have seen equally good results from men who use five or ten pounds of pressure. My later operations were all done with low pressure of approximately ten pounds, but there is a difference in opinion as to the amount of pressure required. My first impression was that the smaller the filling, the greater the pressure required, but I have lately come to believe the reverse, for the very reason that the writer has stated, namely, that a large amount of molten metal takes longer to cool, therefore you must keep the pressure on until it is cold, and it takes more pressure to move a heavy body than a small one.

Another phase of the paper that is particularly interesting to me, one that in the beginning gave me a great deal of trouble which I hardly knew how to overcome until Dr. Taggart explained it to me, is the condition of the gold after repeated heating. I found that an ingot of gold when it first came from the dental depot would cast very easily. At the second heating, it could not be made fluid as easily, and the third time less so, and the fourth or fifth time it was almost impossible to get the desired result. I began using the potassium nitrate, as mentioned by the writer, and the results are wonderful. Take one-fourth of an ounce of gold, melt it into a button, and re-melt it three or four times, and it will be surprising to see the difference in color and form. When it first comes to you from the mint, or the assayer, as it cools it will take the form of a marble, nearly; two or three meltings will change it so that it will take on the shape of a saucer. The first

melting will give you a bright shiny surface, the second a duller one, and at the fourth or fifth melting it looks as though there were an alloy on the surface. I was glad that the essayist brought that out, because it is essential to know it for successful work of this kind.

For a very short time the dental profession will probably recognize that there is but one principle practicable in the casting of fillings. I cannot believe that the few men who are using the centrifugal machines and the vacuum machines will continue to use them long. They will all have to come to the casting machine. I am not speaking of Dr. Taggart's machine, but any pressure machine, and the pressure, it seems to me, should be in proportion to the size of the inlay or the amount of metal used in the casting itself. If that be true, it is only a matter of a short time when I think almost every one of you who does not possess a casting machine now, will have one.

It was my pleasure to speak at the Second District Society the other evening when the question of the impression method was under discussion. After the meeting we had a short demonstration of it by my son and myself. A gentleman said to me: "Doctor, I have abandoned all that." I said, "What do you mean?" He said, "I have given up making cast gold fillings and porcelain inlays entirely." I said to him, "For goodness' sake, what are you doing?" "I am putting in the old-fashioned gold foil and amalgam fillings." I said to him, "I pity you, my friend." It was all I could say.

The cast inlay surely has come to stay, and it is just as sure that men of the type of the essayist will put us on the right track. You and I, who are not capable of such intricate investigation, because we do not have the time, must rely on such men. The queer part of it is that the men who make these investigations and give us the best results are just as busy as the rest of us; but they work until the late hours of the night, burn the candle at both ends, and we profit by it.

We owe a deep debt of gratitude to the essayist, as we do to all those who have presented matters of this kind before, and I am free to confess that I have not seen any investigation of a scientific nature upon investing materials before today. All research has been connected with the apparatus itself, or the principle of casting gold; but the vital point—the most important of all—is that of the investment, and if that is true, then what has been presented this evening goes farther toward solving the problem than anything I know.

Dr. EVANS. What kind of investment material did Dr. Van Woert use?

Dr. VAN WOERT. It was Dr. Taggart's new investing material; what it is I do not know. I meant to state that the powder and the water are weighed, to assure an exact amount of each, and the mixing is done by the watch—the spatulating has to be very carefully done. I followed Dr. Taggart's instructions to the letter, and the results warrant the extra precautions taken. The inlay shown is just as it came from the casting machine. I doubt if any of you ever saw a smoother casting of such a large size—not because I made it, but because Dr. Taggart's investment made it possible.

Dr. EVANS. The paper that has been presented tonight is a very scientific one, and shows that the essayist has spent a great deal of time in these investigations, for which we all ought to thank him. The paper is consequently too intricate and extensive to be properly discussed by me on scientific lines. Like Dr. Van Woert, I have had merely practical experience. I agree with the essayist regarding results without going into details, but I have this to say regarding inlays and investments: Suppose we do get up an investment or a model that is absolutely perfect and does not shrink, and we cast an inlay that is absolutely perfect in size and shape, and place it in the cavity, what have we? A perfectly fitting inlay? Where is there room for the cement?

Dr. Head of Philadelphia, read a paper before the state society last spring

which I discussed, in which he states as the result of experiments that the thinner the edge of cement, the more quickly will it wash out. We cannot securely cement inlays of gold or porcelain unless there is room for the cement.

It was for this reason that I introduced the use of a diamond-point drill, aided by a mounted lens, to remove the inner surface of the porcelain of an inlay to about the space represented by No. 34 U. S. gage from the edge. From gold inlays I remove the metal the same distance from the edge with a small spoon-shape excavator, by scraping from the edge to the center. I remove enough porcelain or metal to provide for a substantial layer of cement. At the bottom or other sides of the cavity in the tooth, when circumstances permit, I remove a little of the dentin. Gold inlays I either press or tap down into the cavities, and burnish the edges before cementing. In this manner, with gold inlays I secure an absolute fit at the edges.

Should a cast gold inlay not approach to within $\frac{1}{1000}$ of an inch of the margins of the cavity, the edge is brought close in this manner. I do not remember that I have had any gold inlays loosen, but I have had porcelain inlays do so. For that reason I do not generally hold porcelain in favor. We have, however, to use porcelain in the front teeth for esthetic reasons, and ladies in New York society will no longer tolerate the appearance of gold in their front teeth, even though porcelain requires renewal. In a paper which I read before the First District Dental Society a few years ago I showed how in most cases, if the teeth are sufficiently separated, the labial wall of the enamel may be preserved, the palatal wall removed instead, and the gold introduced from the palatal side. When the cavity is filled, the gold is trimmed and tapered inward. Gold so finished will in most cases not be visible when the teeth come together. This will greatly lessen the necessity for the insertion of porcelain. You see advertised in the dental journals a matrix for use in filling the front teeth. This advertisement is accompanied by an illustration

of a central and lateral with the greater portion of the labial walls of the teeth cut away. I think such work is a libel on skilled dentistry. It is done for the sake of easily introducing the gold fillings.

Gold inlay work may be used instead of large foil fillings, but it will not take the place of gold foil fillings in small cavities in the front of the teeth, which will always call for skill on the part of the operator.

Dr. CHAS. P. HARDY, Summit, N. J. If we had more investigators like Dr. Ward, we should know more about this matter, and more about gold and inlay work.

I have done a great deal of inlay work, but like Dr. Van Woert, my knowledge is derived solely from clinical experience. I have not much time or opportunity to look after the scientific side. I think, however, that our present investing materials, while they are probably not as good as they might be, are sufficiently good to enable us to obtain good results. I am very proud of the work I can do, and I have seen beautiful work that other men have done, the inlays being as nice as any gold filling could be, great big contour fillings that look beautiful. If we can secure a better investing material than we have at present it would be a great advantage, of course, but it is not necessary in order to enable us to do good inlay work.

As for the edge of the filling, of which Dr. Evans spoke, one of the chief requirements in putting in an inlay is to thoroughly burnish down the edges, whether your filling fits accurately or not. If pure gold is used you can burnish the edge and make a good inlay always.

After the cavity has been prepared, the impression taken, and the inlay made, the tooth-structure should be cut away near the edges of the cavity. Then cut away the inlay, making a corresponding groove as well as possible around this, and so allow for quite a body of cement at this point between the inlay and the tooth.

Dr. CHAS. F. ASH. I do not know

very much about the scientific aspect of investment materials, but I do know that all of the troubles which the essayist mentioned in his paper have been met with under various conditions in my laboratory.

We have made an effort to discover why certain effects were produced, especially in regard to the shrinkage of metals, and how they could be overcome, but my time and my scientific knowledge were too limited to secure any accurate results.

I have used some of the artificial stone which was recommended by Dr. Price, but not enough to be able to get conclusive evidence in regard to its use.

It has occurred to me more and more strongly every time I use the inlay process, how much we are dependent upon men like Dr. Ward, Dr. Taggart, and Dr. Price for what we know. That is no more true in our profession than in other professions—in the other branches of medicine; ninety-nine per cent. of the practitioners have to depend upon the one per cent. of the investigators. I am afraid the tendency in the various branches of medicine, including dentistry, is to overlook the great amount of gratitude which we owe to these men. They rarely receive the full measure of praise and gratitude which they deserve for the amount of work and study and the sleepless nights which they put in.

I want Dr. Ward to feel that the profession, as far as this society is concerned, is deeply grateful for the effort and the work which he spent on this paper, and the results which he has given us.

Dr. M. L. RHEIN. I feel that we are very much indebted to Dr. Ward for his very scientific presentation of the investment question. I realize that the real secret of success lies in a proper understanding of the investment material. This has been the weak point in inlay work in the past, and it is bound to be so until all difficulties are overcome. The ideas expressed here tonight about an excessive amount of cement under the inlay are very erroneous, in my opinion. I do not agree for a moment with the statement that we should

not make inlays fitting as perfectly as possible. Nor is a perfectly fitting inlay inconsistent with securing a sufficient amount of cement under it. These two are not incompatible. The fit at the enamel margin should be perfect, and as you deviate from a perfect fit at this point, your inlay will be defective and lacking in permanence—it makes no difference whether your inlay is of porcelain or of gold. I do not believe in a pure gold inlay; there are many reasons why a percentage of platinum is beneficial. The best results are hardly obtained by burnishing the inlay. We all know that a great deal can be done with pure gold after the inlay is set in the way of remedying any defects in the preparation and the fit, but when the impression method is pursued to the best of our knowledge, nothing more should have to be done to that inlay from the time it is set. It should fit the margins so nearly perfectly that no instrumentation of any kind should be necessary after the inlay has been cemented in position. If this can be accomplished, the results which you can obtain by adding a small percentage of platinum to the gold are so superior that it is inconceivable to me why anyone should still use pure gold for an ordinary occlusal inlay, which will have to bear a certain amount of stress, because no better results in specific gravity nor in density can be obtained with an inlay of pure gold than with a hammered filling.

The discussion unfortunately has drifted from the subject of the essay, which is chiefly concerned with the scientific manipulation of investment material. I do not wish to leave that part of the discussion, and am very much in sympathy with the idea expressed by the essayist that we should understand and should have in our possession an investment material that will take a given amount of material and a given amount of water that must be measured in order to procure the same result on all occasions.

In regard to the treatment of investments, we all have, of course, been speak-

ing from clinical experience. My experience differs from that of Dr. Van Woert in regard to the condition of the inlay, in that I have found that we get the best results if the mold is allowed to become cool.

Dr. GEO. EVANS. I wish to correct the impression of Dr. Rhein and the other gentlemen that I had the slightest idea of wanting to leave an inlay open at the edge. Nothing of the kind. Gold inlays I believe should be burnished when they are fitted in the cavity as closely as possible, and after they are cemented, burnished again. I think burnishing beforehand is proper to turn down the edges and insure an absolute fit. When I spoke of trimming off an inlay to within a space of about 34 gage at the edge, I specially referred to porcelain inlays, which require that the cement should be of a certain thickness under the inlays to retain them, as was demonstrated by Dr. Head. I found by practical experience that this proportion is absolutely necessary. I have re-cemented many inlays that had been inserted by other dentists, especially in Europe, for patients that returned to this country. In most of such cases three or four cuts across the porcelain was all that was done to make space for the cement. When the inlays were pressed to position, the cement was almost entirely forced out.

The paper covered many points, and I did not take notes, but there was one point I remember relative to chilling gold after casting. Gold when cast should by right be allowed to cool slowly. The manufacturer of gold foil recognizes this fact and uses every means possible to cause the ingot to cool slowly, so that the molecules of metal may so unite as to impart the greatest tenacity to the gold for rolling and hammering it out into foil.

In cases of pyorrhea, when inlays with connecting bars are cast of clasp metal for the purpose of supporting the teeth, the metal should not be suddenly chilled after casting.

Dr. RHEIN. I was wandering from the subject when I spoke of the cement

portion of the inlay. I do not wish to leave the impression that I do not believe that there should be a sufficient amount of cement, but I think it ought to be back of the enamel margin, which ought to approximate as perfectly as possible. I thoroughly agree with Dr. Evans that there should be plenty of room left for the cement, but it should be away from the margin. In other words, room is made for the cement by cutting deep undercuts in the wax model.

Dr. H. W. GILLET. I feel that it is impossible for a man in everyday dental practice to attempt any adequate discussion of a masterly scientific effort like this. Dr. Ward has the facilities and the education that enable him to gain the definite information needful for final conclusions in these matters. All we can contribute is our opinion based upon that very deceptive thing—clinical experience.

I do not quite agree with the tendency that has been shown in the discussion to question the practical value of the results which Dr. Ward has given us. It seems to me that such comment is aside from the mark. In order that the casting process may yield us its greatest benefits, we need definite information on every detail of the process. Such knowledge is essential to uniform results. Doing things in a hit-or-miss way, using one investment today and another tomorrow, heating it to different temperatures at different times, and handling it in entirely different ways, is not going to lead to accurate results.

I feel it is highly important that the kind of work Dr. Ward is doing should be continued.

The single point which I want to urge is that we should exert our influence toward the practical utilization of this information. When Dr. Ward has continued his experiments to the point where he feels that he can make definite statements as to what will happen with a given investment material, handled in a definite way, then we shall have reached the point where someone with the requisite skill to make that investment according to his instructions should take

the matter up, and put it in our hands on a commercial basis. After my conversation with Dr. Ward, I should feel great hesitation in attempting to use anything of the sort that would come from the hands of the average manufacturer. Very likely we shall shortly have investment materials on the market *claiming* to duplicate Dr. Ward's formula. From what Dr. Ward has told me, I think there will be grave doubt as to their value, unless they come from the hands of chemical engineers, men who are capable of carrying through just the sort of processes that Dr. Ward has described to us tonight.

Dr. VAN WOERT. I wish to emphasize the point which I brought out about the casting in a hot or cold crucible or flask. Dr. Rhein's remarks make it a little clearer to me that the hot crucible will keep the casting warm long enough to get the least possible shrinkage with the pressure on it all the time. That has been a clinical experience, and I am bringing it out in order that Dr. Ward may criticize it and give us the reason, so that we may all profit by it.

In speaking of the different investments, I was not depreciating Dr. Ward's work. There is not a gentleman present who feels more deeply under obligation to Dr. Ward than I do. What Dr. Gillett has said makes it more evident that we should avail ourselves of the best we have until the other comes along, and not sit down and wait; but the day will come when we shall have the ideal investment, and the work of such men as Dr. Ward will be the means of procuring it for us. We cannot wait until he has completed his results, when we obtain such good results as we are having from the means that are at our disposal now.

Dr. WM. B. DILLS. This is the most interesting paper on this subject that I have ever heard. I wish to thank Dr. Ward personally very much.

Dr. WARD (closing the discussion). I might say that I have not attempted at all to steal the glory from anyone else, but I have had unusual facilities for carrying on work, and have simply pre-

sented to you part of the result which I have reached, and have described to you the manner in which I am obtaining it. There are some parts of the work which men are rather loath to countenance; the cold mold, particularly, I have had questioned more than anything else. Men have stood up in holy horror at the idea of it. The principle of using a cold mold is right. The only way in which an engineer would countenance the casting of gold so as to prevent shrinkage is as I have suggested, and as Dr. Price has mentioned in speaking of casting under pressure. Many have the idea that they must cast in a red-hot mold or a stone model. I presented this paper because I wanted to do away with the idea that the stone model must be used in order to warrant good results. I wished to figure out mathematically that it is not necessary to counteract absolutely all shrinkage. The shrinkage is so very minute that the cavity preparation will counteract it.

The statement was made that results are usually satisfactory. That is the case in my experience. My results are satisfactory most of the time, but every little while something occurs which makes a filling a little imperfect. Whether the inlay has warped or shrunk, I do not know. It is annoying to have things go right ninety-five times, and wrong five times. It would drive most men to trying something new.

The investment has more to do with such occasional failures than anything else. We are demanding something which no engineering process has ever demanded, that is, a fit for every case. We, like the tailor, must make a suit of clothes for every case. The materials which we have at our command are too limited. The four refractories and their compounds that cover the field in engineering seem at present to cover our field as well. The field is so limited that it should not take a long time to solve the difficulty, though it cannot be solved by anyone who does not understand the composition, the size, and the shape of the materials of which he makes an inlay.

I cannot dwell too much on what Dr. Gillett said. If you use plaster in your investment, and let it stand overnight, many more crystals will form in the plaster of Paris. The best results will be obtained by having the investment set for about one hour, and not overnight. The one investment least liable to check in my experience is the one in which all the plaster of Paris has not crystallized, after it has set for from thirty minutes to one hour. It has been a practical observation in bridge work that the plaster of Paris which is not allowed to take up all the water is least liable to change.

I have nothing further to suggest in the way of investments. The investment which I suggested to you tonight in my experience is very good, providing that I can get plaster of Paris twice alike, which I cannot always do. I have been dumfounded at the way in which some plaster of Paris behaves.

The plans which I have suggested are such as I think an engineer would suggest in a moment, even though he would use other possible materials. Do not use all fine materials. You will thus prevent warping of the mass and a great deal of shrinkage, but a great deal of skill and a knowledge of the materials used is required.

The men who do not watch all these factors will fail absolutely. We have tried this plan for three or four weeks, and I could not say how many scores of fillings have been made in this way, without any failure. We have tried three other grades from other houses that have behaved differently. They look different under the microscope, and do not set in the same manner. Not until some uniform plaster is put on the market, and until that maker puts on his directions, "Mix this with so much water, allowing it to set for such a time," will we approach anything like an ideal investment.

Dr. GILLETT. How much pressure would you use to counteract shrinkage?

Dr. WARD. Five, six, or seven pounds on the filling itself. A higher pressure is very impracticable with our present investments.

Dr. GEORGE A. PALMER. Suppose you were casting a cap or a band, would you cast that in a cold investment?

Dr. WARD. Yes. But you must get the moisture out first. I always take the mold and hold it to the light, to see if there is any steam escaping, or any smoke from the wax. You do not have to burn out all the wax, but you must see that it does not escape rapidly, so forming a back pressure.

Dr. BLUM. How is it that I am unable to cast a small piece of gold against a large piece? When I cast my plate first, and want to cast my teeth on, I never succeed, no matter how hot my flask is.

Dr. WARD. I think that you might have a piece of gold so large, and one so small, that the radiation would be so great that the small piece would not stick. I was referring to small investments.

Dr. Rhein spoke of the cast with an alloy of platinum and gold. If we are supplying a piece that is to bear a great deal of stress, perhaps that may be a good plan, but I should feel that the effort to get the margin tight is destroyed in that procedure.

One gentleman spoke of the ingots being cooled slowly in order to impart tenacity to the gold. That is something we must forget in this work. If in an inlay which has been heated to a high temperature and chilled quickly you prevent shrinkage, you obtain a lower specific gravity, and consequently a weaker inlay. The electric arc gives a heat of about 6000°, the oxyhydrogen blowpipe nearly as much. If you cast gold under such heat into a cold mold the specific gravity is very low. We must disregard the tenacity for the present. We are working to prevent shrinkage. The chilling of metals in annealing plates and in using foils is an entirely different proposition. We chill the plate to preserve an existing condition, a softening produced in order to relieve a state of strain. In that case we are preserving an existing condition, but in the other case we are trying to prevent shrinkage. We are

sacrificing something in order to prevent shrinkage.

The question of pressure is one that is neglected a great deal. I have a filling here which I shall pass around, which represents one of a number that I have gathered from the work of students, showing what happens when soft investments are used. Just at the base of the sulcus, just below the sprue, the inlay touches the model first, showing that the gold, when it came down there under the pressure applied to it, made an indentation in the impression.

We have used the Taggart machine with some of the soft fine investments, and found even then a number of times that our fillings would rock a little. Our explanation is that the investment had bulged because it was too soft.

The condition of the gold has also been spoken of. I have here a small ingot of gold; some of you have seen a similar one before. Those who use the ordinary blowpipe will not get iron into the gold from the investment to any extent. Gold and iron will not unite readily under the ordinary blowpipe, but under the oxy-hydrogen blowpipe they will unite readily. This button of gold shows you what will happen to the gold if there is plenty of iron, and there is iron wherever there is silica. These two are inseparable.

The ordinary blowpipe, however, will contaminate gold to such an extent that it will not cast, and the nitrate can be applied in such cases to good advantage.

Dr. PALMER. How do you use the borax and potassium nitrate?

Dr. WARD. Mix them thoroughly in equal parts and turn the flame on. With the other hand sprinkle on the potassium nitrate and the borax. You can take one-quarter borax and three-quarters potassium nitrate, but about equal parts give the best results, I believe. Keep the gold molten while putting on the potassium nitrate and borax. Continue sprinkling that on for five minutes. If it is still a sluggish cast, keep on sprinkling longer the next time. With old fillings this is the standard process to pursue, as it is a standard dry process for purifying gold.

That is about all I have to say, except that I hope to do a little more work on these investments. I have not finished this investment material, but it is doing our work for the present, and it will probably continue to do it for the remainder of the year. These are not simply my results, but the results of engineers as well; in fact, I do not think that I have made any statements in which an engineer would not back me up. The marketed investments are most unsatisfactory, certainly, as long as you may take up one of them any day and find silica in it, and the next day alumina, and the next day something else again—three different products sold by the same manufacturer in a short time, and packages all bearing the same label.

Dr. BLUM. Is there enough surface on that little button for the pressure to act on?

Dr. WARD. If you had the engineers to consult, they would say to measure the metal first. They calculate in some cases to a close margin, thus avoiding any excess of metal. In this case you would not gain very much by an exact calculation, if you chill the button immediately. The engineers often use feeders and supply an excess through these feeders to make up for the shrinkage, which usually manifests itself in the form of a hole in the casting.

Dr. EVANS. Do you think your experiments will lead to a harder investment? All those that we have at present are very soft, and I think many of the misfits are caused by this softness.

Dr. WARD. I do. We have one or two coarse investments now, though I cannot say that they are the same each time. Some physical changes occur in them which I cannot explain. If I say the shrinkage is in proportion to the plaster used, it is generally true, but if you put in too little plaster, the shrinkage would be double.

Dr. RHEIN. Regarding the alloy of gold and platinum, have you made any practical experiments with that?

Dr. WARD. I have not.

Dr. RHEIN. We have such superior results in casting by using a definite

proportion of pure gold with a definite percentage of platinum—five per cent. of platinum—that I was interested to know what experience you had.

Dr. WARD. The statement I made is a principle which usually holds true, namely, that two metals of a given tenacity and malleability will have these qualities in reduced form when put together, which would also be the rule with platinum and gold. Both are quite fluid when melted, and cast very nicely.

I think the edge could be burnished over very nicely.

Dr. RHEIN. You do not need to burnish it over at all.

Dr. Ash moved that a vote of thanks be extended to the essayist for his excellent paper. The motion was unanimously carried.

Adjournment.

FREDERIC C. KEMPLE, D.D.S.,
Editor N. Y. Odont. Soc.

CONNECTICUT STATE DENTAL ASSOCIATION.

Forty-fifth Annual Convention, Waterbury, Conn., April 20 and 21, 1909.

(Continued from page 999.)

WEDNESDAY—*Morning Session.*

THE meeting was called to order Wednesday morning April 21st, at 9.30 o'clock by the president, Dr. Beecher.

The first order of business was the reading of a paper by Dr. OTTO E. INGLIS, Philadelphia, Pa., entitled, "The Central Thought in the Consideration of Pulp and Pericemental Diseases, with Especial View to Diagnosis."

[This paper is printed in full at page 1068 of the present issue of the Cosmos.]

Discussion.

Dr. M. L. RHEIN, New York, N. Y. The subject under discussion is a very complex one. I have very carefully perused the essayist's paper and the more I have thought of the matter the more difficult it is for me to decide exactly on what lines to discuss it. It would be very easy to speak on different phases of this subject, but to confine oneself to an intelligent presentation of the subject-matter is a little difficult in my mind. There is no question as to the importance attributed to the differential diagnosis of any form of pathogenic condi-

tion that we may meet with in that region. If dentists as a class are defective in this one respect, it is due to the fact that our methods of dental education have never seemed to be such as to impart the knowledge of how to make a differential diagnosis. Dentistry has been too often but too properly accused of being entirely too empirical in its action, in its treatment, and this accusation is based entirely upon this primary professional fault, which is undoubtedly a fault in training. After a young man has been taught along certain lines for a certain number of years, it is very difficult for him to change his methods of procedure. The very essence of treatment is to find out first what is wrong, which is the principle involved in diagnosis. I venture to say that there are very few men within the reach of my voice who, after they once know positively what is the matter in any case in the mouth, would be at a loss as to the proper procedure. It is not the lack of knowledge or ability to do things which limits the average professional man; it is the lack of knowledge that will enable him to know what is wrong,

and consequently the paper of the essayist is a very valuable one, because there is no gainsaying the fact that the principles of dental education as taught in every exclusively dental college are extremely faulty in that respect. They are faulty because there is no dental curriculum so designed as to render it possible to teach the principles of proper differential diagnosis. I have no doubt that the essayist will be eager to refute this assertion as far as his own institution is concerned, and that Professor Black may be inclined to do the same thing, but I am speaking advisedly on this point, and I say it for this reason: We cannot separate a part of the body from the whole, and until dental education starts with a general and accurate knowledge of the entire body, the same knowledge that is part of the thorough education which a complete medical course gives, this accusation will be bound to stare the dental teacher in the face, and there is no possibility of overcoming it by any simple form of education which excludes everything that is known of the subject of scientific medicine.

This may be unpleasant pabulum for a body of dentists to digest. Men who come as guests before societies, dental or other, generally like to say pleasant things, but those of you who know me well will appreciate the fact that my intrinsic love for truth and candor prevents me from discussing a question so important as this without giving you the essence of my thoughts on this subject. It is not a pleasing task to present this matter in this light, but I defy any of you to consider this matter carefully and refute my statements.

In the lectures on oral pathology which I have given for a number of years, I devote all the time and ability at my command to impress upon my class this fact, and I say it to them in somewhat these words: "You are leaving this institution in a few months with the privileges and rights to practice dentistry. Your education is partial. If you are told what the trouble is in a case, you will know what to do, but nothing will place you in a more un-

fortunate position in the treatment of diseases of the pericemental tissues and the gums and of any conditions involved in the subject under consideration this morning than your inability to make a proper diagnosis. Now, the advice that I give to you as young men is that as soon as you leave this institution, proceed to follow up your studies; whether you do so in a medical institution or not is not of primary importance; the M.D. degree is not the thing that is going to give you knowledge, but each and every one of you can follow this line of study without necessarily spending his time in an institution or taking a degree. But if you wish to be successful in knowing what is the matter with your patients, you must acquire as much knowledge of scientific medicine as it is possible for you to obtain." I try to make this as impressive as I can to my class, because I feel that every dental student when he passes out into practice, though he may have good technical ability, when he is confronted with questions such as these is seriously hampered.

I must say that there are a number of things that the essayist has presented on this subject that are somewhat mystifying to me from the point of diagnosis. His detail of symptomatology I can follow very closely, and to a great extent agree with. The man who is entirely fitted to practice dentistry is in a peculiar condition in regard to diagnosis. He is much in the same position as the man who is furnished with an outline from which to paint a beautiful picture. In other words, the man who has found his proper place of work in the world, after a certain amount of experience learns to make a correct diagnosis intuitively. This was the case with the great physician of centuries ago. He had no knowledge of scientific medicine as we have today, but he was intuitively a diagnostician, and this is a faculty that a great many successful dentists acquire from experience; but to be able to make a differential diagnosis in the way that the essayist appears to outline, if I understand him correctly, is beyond my power, and I do not feel that in this

day of science we have any right to trust to what I may term a snap diagnosis, whether it is correct or not. I refer to one of the opening paragraphs of the essayist's paper where he says: "A little imagination based upon a fine differentiation of grades of vascular disturbance enables one to diagnose with reasonable accuracy, and to apply indicated therapeutics with a success which does not attend a haphazard judgment of the particular case." I am particularly well aware that time and again I am enabled to make a correct diagnosis of certain diseases immediately upon looking at a case, and upon a careful scrutiny of this particular case, but I decry anything in the way of instruction of this kind. The essayist's contention above is wrong and unscientific, because I have sometimes found myself in error, that is to say, I have found that I have had to reverse my original judgment in certain conditions. I will admit that it is impossible for the diagnostician to refrain from making a mental diagnosis, but he should beware of giving expression to that diagnosis before he has corroborated it.

The subject of this paper as presented by the essayist involves in my opinion one of the most scientific and important factors of our professional life. Unfortunately, it is one that we have so little truly scientific knowledge of, that it is to my mind impossible to begin to make the proper differential diagnosis that the essayist speaks of. I have been working for years in the field of the varying forms of pathogenic conditions which the pulp and the contents of the root-canals present, and I find myself met with the fact that if I could give up my active work as a dentist and devote my time exclusively to laboratory investigation of the conditions of pulp-disease, at the expiration of my normal life I might have succeeded in accomplishing a little bit in this direction. In my opinion we have just begun to knock at the door of understanding the different forms of pulp-disease. It may then be more or less true, as it has been in the past, that in many of the general

diseases we would not be able to do much more for our patients, even if we knew more. We cannot say, but I believe that we might be able to do a great deal more in the line of preventive treatment if we understood the different forms of disease that are presented in these tissues. In order to understand the variations of pulp diseases, the dentist would have to start to examine the pulp-chamber contents and the canals of the teeth that are in an unhealthy condition long before the pulp has died, and the difference in the pictures that he will find under the microscope is so great that it is astounding to the scientific observer, though not strange if one stops to consider the character of the tissue involved. There is no reason to be surprised that we are able to find in the pulp tissue every form of pathogenic degeneration that is found in every other tissue of the human body. It is not unreasonable to suppose that if we find a certain form of pathogenic condition in one pulp and a different form in another, the reason, the etiology, must be different. Prophylactic dentistry, of which we hear so much at the present time and of which so little is really understood, if we delve into the true depths of its meaning, consists of a great deal more than oral hygiene. Oral hygiene only skims the surface of what will be known in the future as prophylaxis, because the real essence of prophylaxis consists in the ability to prevent, to interfere with the etiologic factors that bring about certain forms of dental lesions that are most difficult to contend with, notwithstanding all the hygienic care that can possibly be taken by the patient.

I have tried to concentrate myself as far as possible upon the main point in the essayist's paper, and I desire to impress upon this body of practitioners that the man who wishes to perfect his ability for effective and successful treatment of his patients must seek the road to success by gaining all the knowledge possible that will enable him to diagnose his cases, not intuitively but scientifically.

I agree in the main with the state-

ment of symptoms mentioned by the essayist, but I feel that I cannot examine the mouth of a patient and make a differential diagnosis in such an easy way as the essayist seems to.

The essayist, leaving the subject of diagnosis, entered the domain of treatment in a partial way in his mention of a number of cases, and there is one little feature in his paper that I wish to emphasize, namely, the conditions of imperfect root-fillings that he has removed, and in which he found portions of living pulp tissue. I have heard this statement contradicted so often that I wish to emphasize the fact that such conditions exist, and very frequently exist, and in my opinion are a profound cause for inflammatory conditions that may explain neuralgic conditions of a grievous form. The essayist also said, if I recall correctly, that the use of arsenic is safe if the apical end of the canal is in a normal condition, and he described very beautifully the action of arsenous acid. To my mind the time has come in the practice of dentistry when the use of arsenous acid should be considered an absolutely erroneous practice, to use a very mild expression. I am not at all in sympathy with the frequently propounded doctrine that in certain forms of hyperemia we can depend upon the effects of cocaine for anesthesia. I fail to find the percentage of conditions such as is frequently outlined by different writers on this subject. But even if we were debarred from the use of that valuable agent in pulp-removal, I should still most strenuously oppose the use of arsenous acid as an aid in pulp-removal, for two reasons. In the first place, after being obtunded, the pulp of a tooth should be removed alive, and before there is any possibility of infection reaching it. I should like to dwell at greater length on this point, but the time at my disposal is too short to explain my reasons for this position. It is unnecessary for me, in addressing men some of whom have been in practice for such a long time, to dwell upon the untoward results of arsenous necrosis around the alveolar sockets, and the effects of peri-

cemental irritation, though there need not necessarily set in subsequent necrosis of the tissue itself. It is for these two reasons that I think it is time that the arsenous treatment of pulps should be relegated to the realms of antiquity, and should have no place in the modern treatment of dental lesions.

The essayist devoted considerable time to the diagnosis of teeth with dead pulps, and I wish to dwell a little on this point. The number of such teeth is very great, far greater than the young practitioner ever dreams, and while the essayist incidentally spoke of the use of the Roentgen ray in a couple of cases, he omitted to mention the fact that no other diagnostic agent that has been introduced in my life-time begins to compare with this agent for substantiating the diagnosis both of this condition and others. The essayist also left out of consideration the value of intense cold in this respect. I do not mean a temperature of 0°F., but the immediate application of a temperature of at least 20 or 30 or even 70 degrees below zero to a tooth. The Roentgen ray and the subjection of the tooth to a degree of intense cold far below zero are the two surest means of making this most valuable diagnosis.

In nearly all of the conditions that the essayist spoke of, the same thing in regard to the X ray is true, and it is surprising to me that he should have paid so little attention to the value of this agent. Only yesterday, the very last case that I examined in my office was one of which I had just taken an X-ray picture and in which I made a differential diagnosis of pulp-stone. I saw this case originally three or four days ago, and on Saturday I took two X-ray pictures, which surprised me so much by the clear and distinctive outline I received of this condition that I decided to take another X ray in order to see if possibly there was something wrong with my film. This was the case of a patient who had been suffering from trifacial neuralgia for the past six months and had gone the rounds of a number of dentists. She has had two teeth extracted, without gaining relief, and I

have never had more substantial satisfaction from the use of the X ray than I happened to have yesterday in this case. I wish to remark that this was an unusually satisfactory result of the radiograph, one of the most unusual that has fallen to my lot. A radiograph, of course, cannot be read as satisfactorily as a photograph. This the dentist has to learn, and he will require a little instruction in order to understand what he is looking at, but when once he understands skiagraphs, it is an easy thing for him to know if there is a chronic abscess at the end of the root, if it circumscribes only a part of the root, or the side of the root; in fact, with the proper angle of adjustment of the film you are able to determine almost any deposits that may be on the outer periphery of the roots of the teeth, and this is very often a very important point in differential diagnosis in treating obstinate cases of pyorrhea in which the local treatment has not been entirely satisfactory.

I feel that I am altogether too lengthy in the discussion which I have given to this paper, and my only apology is that I am so earnestly in sympathy with the subject that if I have distressed my audience unnecessarily, I trust you will forgive me.

Dr. INGLIS (answering Dr. Rhein *). I thank you for the courtesy of allowing me to break into this discussion and answer Dr. Rhein. I think he has rather misunderstood the purpose of my paper. My intention was not so much to give all the possible means of diagnosis as to point out the fact that just the very thing that Dr. Rhein mentioned in the early part of his discussion, together with a little imagination based upon fine differentiation of pathological conditions, would be a great help to the average practitioner in making a diagnosis, perhaps without the aid of the

X ray. Not everyone has an X-ray apparatus in his office, and even if he does, he does not always wish to indulge in a skiagraph for the purpose of diagnosis. There are times when one wishes to make a diagnosis immediately. I do not wish to pose as being able to easily make a diagnosis in obscure cases, as I have distinctly stated that there are times when obscure cases may require a lengthy consideration or even a skiagraph in order to be correctly diagnosed; still, after a little thought applied to the condition presented, together with a little imagination—and I mean by that not simply imagination without basis, but the ability to see with the mind's eye the conditions that one cannot see with the physical eye—will lead to a correct diagnosis.

Unquestionably one has occasionally to reverse one's judgment, and this judgment should not be expressed to the patient before a careful confirmation has been reached. But it does not always require a skiagraph to say that a person has pyorrhea, or an exposed pulp, or some other condition which may present. In fact, in three-fourths of the cases presented the skiagraph is absolutely unnecessary in ordinary practice.

Speaking of having put this forward as a final study of the subject, I would say that I am by no means satisfied with the present relationship between symptomatology and pathology. In many cases we do not know the relations between the actual clinical symptoms and their microscopical expression, and when we do know we shall be better able to make a diagnosis; still, until that time comes, there will necessarily be some place for imagination, because we cannot always take out a pulp to find out what is the matter with it.

I recall a case in particular, in which an upper right bicuspid had been filled with gold for many years. The patient suddenly experienced sensitiveness to cold in that tooth, and I was at first inclined to think that some pathological condition had developed in the pulp, but on a little further inquiry I found that the patient had consulted a dentist a

* Owing to the necessity of keeping an engagement to read a paper before the Southern Dental Society of New Jersey in the evening, Dr. Inglis was compelled to leave at this time, before the discussion was finished.

short time previously and had his upper right third molar treated. On examination of this molar I found a large filling in the buccal surface. I assumed that it would be difficult to treat the roots of that tooth properly from the buccal surface, and concluded that it contained a pulp which was at least partially living. I did not consider it necessary to take a skiagraph, but I took out the filling, opened the tooth, and found the pulp semi-gangrenous. The coronal portion was insensitive, but the apical portion was highly inflamed, and after its removal the symptoms in the bicuspid disappeared. A little imagination in that case led me to believe that there was reflex hyperemia of the pulp in the bicuspid, superinduced by the irritated pulp in the third molar.

In another case a gentleman had an upper left canine which gave no apparent pain on application of heat or cold, but pain was felt in the upper left first molar. This molar was perfectly sound, and I found that it was the irritation of the pulp in the canine that caused the reflex pain in the molar. Arsenic was not advocated, as Dr. Rhein seems to think. I only mentioned its mode of action. It has, however, in my opinion, some legitimate use at times.

We should certainly have a far greater knowledge of not only dental pathology, but general pathology, in order to make our diagnosis properly, and especially in those cases in which systemic conditions may underlie the local conditions.

Dr. A. D. BLACK, Chicago, Ill. I had not intended to say anything on this paper, and I do not like to shoot at a man when he is going the other way, and particularly when he is not coming back.

There are one or two things that have been said that I should like to speak on briefly. First, I might make a little criticism of Dr. Inglis' paper. I do not know whether it appealed to the others as it did to me, but I believe that we should have profited more from the paper if it had been more limited. He has presented three different conditions, each of which to my mind would

have made a better subject for his paper, viz, conditions of the pulp, conditions of the tissues at the apex of the root resulting from pulp conditions, and conditions of the membrane attached to the teeth at the gingival side. I am of the opinion that there would have been less confusion of the conditions presented if he had confined himself to one of these three things. The pathological and physiological processes presented have been interesting, but again I should have preferred a presentation of these conditions in more direct relation to the conditions as we observe them in practice. I mean by that, if these conditions could have been separated into groups, so that the condition itself would have indicated to us the treatment that we should employ to relieve it. Possibly I am a little more confused than the rest of the audience, but that is the way in which the paper appealed to me.

When the tissues about the end of the root are involved, there are, to my mind, three distinct conditions that may present. First, the condition of inflammation about the end of the root in the pericemental tissues as the result of the pulp condition, but without suppuration, there being no evidence of any suppurative process outside of the pulp. Second, a condition in which pus is present, either forming or already formed in the tissues beyond the end of the root; and third, a modification of that condition, in which we have a chronic abscess already established. We ought to be able to differentiate these conditions in a large number of cases by the symptoms which Dr. Inglis has indicated, but yet the essayist did not separate these symptoms into groups, as might have been done in order to impart the best ideas of the conditions as they are presented in practice.

One condition I wish to discuss from the standpoint of diagnosis, namely, the chronic abscess. I do not often need an X ray for making a diagnosis of the conditions that are present in a chronic or even an acute abscess. I do not wish to depreciate at all anyone's opinion of the value of the X ray in the diagnosis;

of these cases, but I believe that a good many men use the X ray more than they ought, and some men have been confused by the X ray and have done things which they should not have done, because they have not read it properly. It is not everyone who can take a good skiagraph, and knows how to interpret it. The X ray should be handled by experts, in the same way as men conduct pathological laboratories. That is their business, and they should know more about it than we do, although we should, of course, be as familiar with these things as possible.

To my mind the greatest error the dental profession makes in cases of chronic abscess is that we do not find out how much tissue has been detached from the end or the sides of the root. That is the most important phase which we should know in each case. If we have a knowledge of the conditions existing there and are certain that not very much of the tissue normally attached to the end of the root has been destroyed, then there is hope of success in the treatment of the case, but if we have a case in which the tissues surrounding the end of the root are involved, and a good deal of the peridental membrane has been destroyed, then are we going to be unsuccessful in the treatment of the case in proportion to the amount of tissue destroyed. First we should find out how much of this tissue has been destroyed; I usually rely on two probes for that purpose. First, a small blunt-end soft silver probe is passed through the sinus to locate its other end. Sometimes the use of that probe is not necessary, as the opening of the sinus will generally but not always be over the end of the root involved. I recall the case of a gentleman who presented evidently a chronic abscess on the lower canine. All the teeth back of that had been extracted, to the best of his knowledge. That sinus led back to an impacted third molar, although the opening was in exactly the position in which we would have expected to find it if the abscess had been from the canine. I would, then, use

this silver probe to locate the other end of the sinus. After that I would take a stiff sharp steel probe and pass it into the sinus to get into contact with the root involved, and with this instrument I should expect to discover in more than ninety-five per cent. of cases practically the exact condition of the tissues attached to that root; that is, in most cases in which this probe has been passed through and has come into contact with the end of the root, by passing it up and down and around the root we can locate without serious difficulty the amount of the root that is denuded of its covering, and just in proportion as the tissue is denuded should I expect to have success in treatment. We know that many of these cases are treated by medication through the root-canals, but in such treatment no amount of skill on the part of the operator will enable him to discover the conditions on the outside of the root. I have seen many of these cases in which no examination of the outside was made at all; in fact, I think a great many practitioners do not make this examination. I simply wish to call your attention to that one point in which we fail to make a diagnosis of these cases, and particularly recommend to you the sharp stiff steel probe for this purpose, because it will tell so much more than a blunt or soft instrument, such as the silver probe. By passing this stiff steel probe into the sinus you can differentiate between the root and normal bone, or between the various conditions of bone or the enamel of an impacted tooth. There is no single instrument that is of so much value to me in conditions of this kind. I learned of this instrument from Dr. Thos. L. Gilmer.

I also wish to say something in regard to Dr. Rhein's statement as to the failure of dental schools to properly present the subject of pathology. I always wish to be on the side of the optimist, rather than on the side of the pessimist, in looking at the conditions of dental education in this country. I think we are traveling at a pretty rapid rate and making good progress; the den-

tal schools as a whole are forcing pathology, general pathology, general anatomy, and all subjects of that kind on our students as fast as they can make the students absorb them, and all know very well that one of the greatest difficulties in our schools is to interest our students in these subjects. They get the idea that they want to get busy making crowns and bridges and filling teeth almost the first thing, and the hardest thing that most schools have to do is to interest students in these subjects. I am sure that you will find that most schools are advancing their teachings in these lines as rapidly as they feel justified in doing without driving their students away. In that connection I should like to suggest that the dental profession as a whole can do much in support of the schools in this work, if in private conversation with men who are going to school they enforce upon their minds the value of these subjects.

The next order of business as announced by the president was a paper by Dr. J. E. POWER, Providence, R. I., entitled, "Some Cases of Stomatologic Interest."

[This paper is printed in full at page 1074 of the present issue of the COSMOS.]

Discussion.

Dr. A. J. FLANAGAN, Springfield, Mass. I believe Dr. Black spoke of the optimist and the pessimist, and it would be well, perhaps, to give the definition of these two words here today. The pessimist, little Johnny says, is the fellow who cannot do it, and little Tommy says that the optimist is the fellow who does not care what happens—provided it does not happen to him. Last night Dr. Black gave a demonstration on a model of a tooth, and as I read Dr. Power's paper it appeared to me that it would be interesting if some pathologist would take a tooth model, and fit it with these little rubber tubes that Dr. Power has spoken of, and demonstrate before all dentists the effect of forcing certain materials through small tubes when there is an obstruction that interferes with the for-

cing. Dr. Power gave a most acceptable illustration of what could be called an everyday illustration of inflammation. He carried me back twenty years to the time of my student days in Philadelphia. At that time we had in our institution a man who perhaps for his day foreshadowed the pathology that is bound to come in dentistry. Many of the students who assembled at the various lectures of that teacher thought he was a little off, and why? Because, as Dr. Black said today, it is almost impossible to induce the average dental student to take up a thorough and explicit study of what is known as pathology. Dr. Black says that you cannot make him take it up; I say, make him take it anyway, as Garretson used to preach. He was a seer, and he was not only a seer, but a believer and a doer. Garretson in my humble opinion was one of the greatest minds that have crossed the threshold of dentistry in the last fifty years, especially when you take into consideration his conception of dentistry. His dentistry was not the dentistry of the fellow who "lives in the tooth," but dentistry not only of the teeth but of the associated parts. I am pleased to see today that a young man has stepped in here, and has given us an illustration of inflammation not alone of the tooth but of the surrounding parts, and when Dr. Power says that all progressive disease can be classed and illustrated as something related to what is known as inflammation, he has given us a great truth to take away with us.

I am going to speak now as an ordinary practitioner of dentistry groping in the dark and trying to do something for his patients. By the term "ordinary dentist" I mean the man who has some patients that are earning from a dollar and one-half to three dollars per day, and trying to support a family. I have patients with more income per day than that, but I am not of the class of dentists who come before us in associations and tell us that we must not do so and so, and if you analyze the conditions you will find that that person is practicing in a large city with a select *clientèle*

that enables him to charge at least ten dollars per hour for his time. His patients are educated people, and yet that person will say to us who are practicing on the dollar and a half man, You must do so-and-so. I wish to sum up by saying that this is an imperfect world, and we are a part and parcel of it, and cannot accomplish perfect things in an imperfect world; this can be applied to dentistry as well as to anything else. Now, you may ask, What is this all about? It is just this: When we have people come into dentistry and recognize the fundamentals, and take the family of the dollar and a half man and do something for him, giving him the greatest comfort possible, even though men who are earning ten dollars an hour for their time will have nothing to do with him, who is doing the greatest good for humanity and for dentistry?

That brings me back to the question of what to apply in order to destroy the pulp—whether we shall use arsenic or whether we shall inject something into the pulp? We have listened a great deal to this question of removal of pulps, and I wish to say that it is about time that some of these pathologists who have studied advanced dentistry demonstrate to us, not in talk, but in facts and figures, that arsenic properly applied in the proper quantity and watched from the start to the finish is producing any more lame teeth than the application of cocain, or some other drug.

I did not wish to rise at the time Dr. Rhein spoke, when called on by the president to discuss the question, for what he said was along the line of inflammation, and Dr. Power's paper—from that point of view—is equally along the line of pulp destruction, but I think it is about time that some of the young men who have risen and asked for information take up this question, and study it and understand it so that they will be able to give the results of experience, and communicate the facts demonstrated, especially in the pathological laboratory. The time seems to have dawned when we should come to these assemblages and talk intelligently from experience and

from facts demonstrated in the pathological laboratory on the subject of inflammation, on the question of pulp destruction, on pericemental troubles, on stomatitis, on the extreme conditions of gangrenous stomatitis, and on noma, and how to handle them. When I hear some men say that the medical men do not want to take these cases, I would say that the advanced man in medicine will be only too happy to turn these cases over to a dental practitioner if he feels that he is able to handle them.

The time has come when we must help these colleges that Dr. Black speaks of. Why do so many men go to the college that offers the least resistance? Because according to the usual, the common acceptance in the average mind, dentistry is a calling of a material nature; but when it comes to the question of an inflammatory process, the question of material is not there, and we must inculcate in the mind of the average person that we have therapeutics, that we have pathology, and that we have laboratories in our colleges, and that the students are instructed as properly in the clinical as in the prosthetic laboratory.

Dr. OTTO E. INGLIS, Philadelphia, Pa. Believing that the best development of the thought expressed in a paper is not always accomplished by praise but by truth-seeking criticism as well, I would say that while in the main I am much pleased with Dr. Power's paper, I would take exception to one or two of the postulates which he has laid down.

After giving a comprehensive view of inflammation in general, Dr. Power speaks of abscess formation as being always due, first, to irritation of the pulp followed by degeneration. He says as follows: "All the progressive steps of inflammation which I have described will occur in the pulp, and if not interrupted will terminate in the formation of pus. The tooth becomes a foreign body and the system tries to expel it." I am inclined to think that in writing the paper Dr. Power overlooked an intermediate step in the pathology with which he is familiar, but which he has not set down. His postulate of irritation followed by

pus formation is a true one, but irritation causes an abscess or ulceration of the pulp instead of an apical abscess, otherwise the pulp must first die through simple inflammation or hyperemic changes. This abscess or ulceration may continue for some time, and has symptoms distinguishing it sharply from apical abscess. It is only through pulp putrescence or direct infection of a previously aseptic apical tissue that an apical abscess occurs via the pulp-canal, though very rarely an apical swelling simulating abscess may be due to an abscess of the pulp.

Regarding the expulsion of needles, it seems to me that migrations within tissues are more directly referable to the influence of muscular movements than to efforts at expulsion. This is more apt to be accomplished by the inflammatory process. I am thoroughly in accord with the idea of extraction of a tooth during abscess formation in the second stage, or while bone suppuration is in progress, if the tooth is one destined for the forceps. If necessary, the alveolus may be sterilized, curetted, and packed with antiseptic gauze to prevent it from filling with a clot. This should be removed in, say, twenty-four hours and the alveolus repacked or not, as indicated. If the extraction be performed without packing, as is often done, and untoward symptoms present, it will be easy to reach the apex of the alveolus by sweeping out the clot. It certainly seems rational to remove the source of offense, which is the putrescent contents of the root-canal. If the abscess be so advanced that no sufficient relief can be obtained through the alveolus, operation must be performed.

Dr. Power's experience with the medical application of the hot poultice is one we all have met with. With all due respect, it is astonishing how slowly the average physician adapts himself to our ideas of dental pathology and treatment. Certainly the hot poultice applied to the face in acute apical abscess is to be condemned, but if diagnosis be accurate, it can be allowed in inflammation or hyperemia of the pulp, in which counter-irritation is desirable and can do no harm. In such cases cold is not applicable.

Dr. Power has cited some interesting cases, which show us how careful we should be in our differentiation of dental pathologies, so that rational treatment may displace such treatment as is based on empirical lines.

Dr. O. T. RULE, Meriden, Conn. This paper by Dr. Power is the most excellent essay that I have ever had the pleasure of listening to on this subject. There are one or two points of which I wish to speak. One is the application of heat. Our circulatory system may be compared to a hot-water heating system in a house, the heat and boiler being respectively the circulatory centers. For illustration, suppose we apply heat to the pipes at a point where the outflow becomes inflow. The water absorbs the heat and is warmer when it reaches the boiler than if no external heat had been applied. Or apply cold instead of heat. The water when it gets to the boiler is cooler than if no cold had been applied.

Now apply the illustration to the circulation of the blood. The circulation in the teeth and face is at a point where the outflow becomes inflow.

As there is always heat with inflammation, the application of external heat simply furthers that condition, with the blood absorbing more heat, and having the tendency to increase the temperature of the blood current which is returning to the heart, and each time it is sent out again perhaps being a trifle warmer, and so eventually helping in the breaking down of the tissue in suppuration.

But apply cold to an inflamed area, and the heat of the area is radiated instead of being augmented, and the blood current is cooled by the application, thus assisting in the conservation and resolution of tissue. Therefore we should apply moist heat only when and where we wish to have an abscess focus.

With regard to the matter of extracting teeth in an abscessed condition, I am glad to hear Dr. Power advocate so plainly the removal of the cause, if we decide that extraction is to be the final result.

In this connection I recall a paper published some time ago in the DENTAL Cos-

mos in which were included replies by eminent men in the profession to a list of questions on this subject of extracting abscessed teeth, and a great majority voiced the opinion that extraction, once decided upon, is the best thing at any stage. So it seems to me that we should enlighten the medical practitioner on this matter of poultices.

With regard to the question of extraction or making an incision into an abscess, as cited by Dr. Power, I cannot see the difference between making a wound in the abscess and thus opening the circulation, and extracting a tooth and thus opening the circulation, providing that in each case we do our best in the beginning to render the area of operation aseptic.

In regard to the tooth being a foreign body, I should like to make this observation. It seems to me that the elongation of the tooth is not due to the effort of nature to expel the tooth, but to the infiltration and thickening of tissues around the apex. As the inflammation increases the blood pressure around the tooth, the apical tissues necessarily thicken, and the tooth is mechanically projected from its socket.

The effort of nature is to expel the infected pulp and the pus which results from it. But the tooth, the result of the normal activity of certain organs, cannot be a foreign body as long as it has a vital organic attachment to the pericementum.

The pus burrows in the direction of least resistance. If the point of least resistance be down at the side of the root, it will discharge at the gingival margin; if toward the lingual, it will occur in that direction, or if toward the buccal surface, it will occur at that point.

It seems to me that there is an error in concluding that the elongation of the tooth is the effort of nature to cast it off because it has become a foreign body, being at that stage still held by the pericementum.

Dr. Flanagan has spoken of pericementitis due to the absorption of cocain in pressure anesthesia, and the application of arsenic for devitalizing the pulp.

I do not recall a case where I had in-

flammation over the roots from applying arsenic, but I did have a case where the arsenic came in contact with the gum tissue, and although no serious results ensued, yet there is danger of serious trouble in such cases. Therefore having found an almost magical preparation in the combination of cocain and adrenalin in Parke, Davis & Co.'s No. 151 tablets, I have thrown As_2O_3 away, and shall never use any more of it. I have had some soreness from forcing in the cocain, but I find that lessening as I become more adept in using it.

Dr. F. T. MURLESS, Jr., Hartford, Conn. In my opinion, without attempting to be epigrammatical, every little item of training that is involved in some higher attainment influences all one's minor activities. I mean by that, that the man who knows a little more about inflammation, its cause and its results, is that much better able to produce correct fillings and to do his daily routine work creditably; and not only so, but by this means he adds zest to routine work. I wish to emphasize the idea that each of us should make the leading thought in our minds improvement, advancement, educational development. Even if the accumulated facts are fragmentary in character, these bits which we gather often come into play in unexpected ways. In fact, all that one knows is frequently demanded in meeting situations of the sort which Dr. Power has outlined. We want for ourselves to do this, we want to do it because we wish to succeed, every one of us, in our chosen profession. So I want to repeat that what Dr. Power has said about inflammation is pertinent. If we have known and forgotten, let us be thankful that he has reminded us, and let us employ all that we know, keeping fresh on what we know and using it to the best of our ability and to the glory of our profession.

Dr. POWER (closing the discussion). I wish first to thank you for the consideration which you have given the paper which I have presented this morning.

First is the question of the importance of the knowledge of pathology. Someone

in the discussion regretted the fact that pathology is not taught in dental schools—I think it was Dr. Flanagan. I indorse all that he has said relative to this most important subject. I believe that Dr. Black said that it is difficult to interest students in the subject. It seems to me that were I a teacher and an educator, I should interest them in it, even if it were difficult. The whole trouble goes back to the question of commercialism. For my part I would rather have five students and teach them what I knew would reflect credit upon our profession, than to graduate a hundred men who failed to recognize the value of the very foundation of the scientific study of disease. General dental work is a great work, and it can never be substituted, but we must be skilled in more than the mechanics of our profession. If three years are not enough to include the study of disease and its causes, then I say add another year. The medical profession is only too willing to give us recognition; they are just as anxious to consult us as we are to consult them. We are the ones to place the true value upon ourselves and our work, and the medical profession and the public will accept us according to that value. There is no excuse for our not knowing what takes place during an inflammatory process. Many times the fault is not with us, but with our early professional training. Pathology as it is taught in most of the dental schools throughout the country consists of a theoretical course extending over a period of a few weeks, which simply gives us a poor definition of what the subject really does consist of. We cannot reflect credit upon our profession unless we understand its importance in the treatment of disease.

Dr. Rule says that he has had one case and does not want to have another. I say that if he continues to use arsenic he will not have another case, because he has learned from that one case wherein his technique was faulty. Of course we should seal arsenic when we place it in a cavity; if it does leak on the gum, then it proves that our technique is faulty. I am not advocating the use of arsenic, because I believe in the efficacy

of cocain, but I do say that you can use arsenic without the slightest danger to either the patient or to the usefulness of the tooth.

I really do not see in what respect Dr. Inglis has taken any exception to anything which I have said regarding the subject of abscess formation. I stated that the inflammatory process first appeared in the pulp, and he said that it appeared probably months back, and that before we get an apical abscess we get a gangrene of the pulp. We cannot have gangrene of the pulp unless an inflammation has preceded it, and wherever we find gangrene or necrosis we must concede that all the other stages of inflammation have preceded them in the tissues involved. In the expulsion of the needle, of course we have muscular activity, but it is brought about by the presence of the foreign body—in this case, the needle. A glass of sufficient magnifying power will show the blood rushing through the area of infection at an increased rate of speed started by the presence of the irritating body. Even if the needle is clean, an inflammation will cause an increased muscular activity, and will drive the needle along in the lines of least resistance in its effort to expel it from the system. In the experimental laboratory we find that muscular activity is in proportion to the amount of stimulation applied to the muscle. Place a rusty needle in the tissues and an abscess tract will follow the needle. We will then have a destruction of the adjacent tissues, and all the stages which I mentioned in connection with the tooth will present themselves here with the presence of the needle.

There is no disease which does not embrace a knowledge of all the principles of pathology. Inflammation is perhaps the most important branch of pathology, because all disease commences with an inflammatory reaction. It is the A B C of pathology; it is not a complex problem. Heat, pain, redness, and swelling are the four cardinal symptoms of inflammation. Study the little black-head, so called, on the face. We examine with a mirror and we find redness, we

place our finger upon the spot and we find heat present. The next day, possibly, there will be a protrusion of the skin and tenderness on pressure. Later it breaks, with an evacuation of pus. You can readily study every step of inflammation that takes place there, and it is the same everywhere in all other portions of the body. We must not confine ourselves to the study of the teeth alone, or to any small portion of the body. We should study pathology in general, and we shall of necessity include the diseases of the teeth and pulp. You cannot take any one disease or any particular part of medicine which has an organic relation with other parts and separate them. We must know the whole in order to thoroughly understand a part.

Someone objected to the use of arsenic because it produces inflammation in the tissues adjacent to the teeth. We must not forget those fundamental principles which are involved in an inflammatory process. If we wish to destroy the vitality of the pulp, it is reasonable to believe that a pathologic condition already exists in the tooth, and also that an inflammatory reaction has occurred already. I should not hesitate to use arsenic in any case, and there are some cases where its use is of special value to me. In the hands of a person who has been graduated from a dental school, possessing the average care and judgment, the use of arsenic will not cause any more injury to the oral tissues than would the use of creasote or carbolic acid. Even if a little arsenic does escape on the gum, necrosis of the soft parts will present itself first, and this can be easily treated by cutting it away.

I do not pack sockets except in cases of hemorrhage following extraction. We sometimes find cases where the extraction of the tooth does not break the abscess. In those cases I open the abscess with a curet or bur if necessary, and evacuate its contents.

Dr. Rule referred to the danger of opening into the circulation and making a new avenue through which the system could absorb poisons. While there is some danger, we are justified in incising

diseased tissues, because we are selecting the most probable curative process for the welfare of our patient.

Dr. RULE. My observation in regard to that was that some practitioners object to taking out the tooth because of that danger to the circulation, but they do not hesitate to lance an abscess.

Dr. POWER. I still believe that the abscessed tooth acts as a foreign body. The fact of the tooth being elongated convinces me that nature is trying to expel it from the body. Dr. Rule says that the elongation of the tooth in the condition described is due to the swelling, thickening, and infiltration of the tissues. Here we agree, and I say again that it is nature's process of ridding itself of that foreign body. If a tooth in this condition is not a foreign body, why does it become elongated? Why do the tissues become infiltrated, and why, if we extract that tooth, do these tissues resume their normal condition?

Dr. RULE. That is nature's effort to rid itself of irritation. The tooth is not a foreign body as long as it has an organic connection, and it has an organic connection with the socket in that part through the peridental membrane, and I contend that the elongation of the tooth is due to the swelling and infiltration of the tissues about the end of the root.

Dr. POWER. But the tooth is the causative factor of the irritation. The tooth which I am describing is an abscessed tooth, and a tooth in an abscessed condition acts as a foreign body. If the pulp is gangrenous, it is a part of the tooth. I do not recommend the extraction of all of these teeth, but on the contrary I advise the removal of that portion of the tooth which is foreign to the physiological laws. I still contend that the swelling and the projection of the tooth from its socket is evidence that it is regarded by nature as a foreign body, and that nature is attempting to rid itself of that foreign body. Dr. Inglis says that it is due to muscular contraction. But what causes the muscular contraction and what is the object of attainment in the muscular activity so described?

In my paper I have endeavored to point

out the fundamental principles that govern the treatment of all disease, and if I have cleared any of the problems which present themselves in the treatment of any pathological conditions in the mouth, I shall regard my visit to your society as most profitable to me.

REPORT OF THE COMMITTEE ON NECROLOGY.

The next order of business was the report of the Committee on Necrology, by Dr. E. S. GAYLORD, New Haven, as follows:

Dr. Albert Newton Gaylord.

Dr. Albert Newton Gaylord died at Binghamton, New York, March 19, 1909, after an illness of five months, in the thirty-seventh year of his age.

Dr. Gaylord was born at Binghamton, New York, January 26, 1873, where he received his early education, being graduated with honors from the scientific department of the Binghamton high school. Very early in life he gave evidence of unusual mechanical taste, and was always most happy when time permitted his presence in a workshop of his own construction. He delighted in electrical science, to which he made valuable contributions, one of which was an electrical time indicator and register, which occupies a very important position in the manufacturing world.

Dr. Gaylord was a graduate of the dental department of the University of Pennsylvania, and immediately established himself in the practice of his profession in the city of Philadelphia, where he remained about eight years. He then spent a year in New Haven, withdrawing in June 1907 to New York city, where he found a field best suited to his taste, until his fatal illness terminated very flattering prospects of professional and social eminence. By his pre-eminent mechanical genius he leaves in the mouths of many appreciative patients rare specimens of artistic skill and usefulness.

He was a member of the National Dental Association, Philadelphia Academy of Stomatology, Alumni Association University of Pennsylvania, New Haven Dental Association, honorary member of the Bridgeport Dental Association, member of the First District Society, Institute of Stomatology, and Odontological Society of New York, New York Auxiliary Delta Sigma Delta Fraternity, and Interstate Dental Fraternity; he was also

past-master of Athelstan Masonic Lodge of Philadelphia.

The funeral services were held at the home of his birth, Sunday afternoon, March 21st; interment was in the family plot in Forest Cemetery.

He is survived by his parents, two sisters, wife, and young daughter.

[The report also contained a brief sketch of the life of *Dr. Horace Sheldon Bascom*, an obituary notice of whom was printed in our August issue.—Ed. COSMOS.]

EDWARD S. GAYLORD,
CLINTON W. STRANG,
JAMES McMANUS,
J. TENNEY BARKER,
LOUIS L. BEACH,
Committee.

Motion was made and carried that the report be received and placed on file.

The Secretary then presented the names of applicants for membership, and on motion was directed to cast one ballot for the list.

The president, Dr. Beecher, was then presented with a gavel by the association.

ELECTION OF OFFICERS.

The next order of business was the election of officers for the ensuing year. The Committee on Nominations, through its chairman, Dr. Griffith, presented the following list of nominations:

President—Dr. F. W. Brown, New Haven.

Vice-president—Dr. F. T. Murlless, Jr., Hartford.

Secretary—Dr. R. H. W. Strang, Bridgeport.

Treasurer—Dr. W. V. Lyon, Bridgeport.

Librarian—Dr. F. G. Baldwin, Ansonia.

Editor—Dr. L. L. Beach, Bristol.

Executive Committee—Dr. H. A. Spang, New Haven, Chairman; Dr. A. E. Cary, Hartford; Dr. W. S. Smith, Mystic.

Motion was made and carried that the report be received and that the secretary cast one ballot for the entire list.

Dr. Brown, the newly-elected president, was presented to the society and expressed his thanks to the association for the honor conferred upon him.

There being no further business to come before the association, the meeting was declared adjourned until the next annual meeting.

THE DENTAL COSMOS

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Devoted to the Interests of the Profession.

EDITED BY

EDWARD C. KIRK, D.D.S., Sc.D.

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PHILADELPHIA, SEPTEMBER 1909.

EDITORIAL DEPARTMENT.

THE HISTORY OF DENTISTRY.

EVER since the organization of dentistry as a profession the interest in its history has called forth various efforts to meet the demand which that interest has created. Articles of an historical character have appeared from time to time in our periodical literature, and two or three works by German and French authors dealing with the subject have been published. All of these are excellent contributions in their way, but they have either been restricted in scope or have been inaccessible to English-speaking readers, hence we have lacked a consecutive and comprehensive record of the history of dentistry from its earliest origins to the present time. The publication of Guerini's "History of Dentistry" not only meets this professional need in a most satisfactory way, but it goes farther in that it furnishes the basis for practically a new departure in dental education. The majority of dental graduates enter upon the practice of their profession with but little

if any knowledge as to how their profession originated, its relations to medical science or its relations to society, or of the forces and circumstances that have caused it to develop into a distinct calling. Unfortunately this lack of knowledge is seldom corrected, simply because the data of dental history are beyond the reach of the average practitioner and can only be obtained by the individual enthusiast having infinite patience and unlimited time at command to search out the details in libraries and historical collections widely scattered over the world and recorded in various languages. This work has been undertaken by Dr. Guerini, who after many years of patient and laborious research has brought it to a successful conclusion in a history of dentistry well worthy of the name. For the first time we now have recorded in their order of development the data upon which the history of our profession is based, from its earliest origins up to the nineteenth century, and in a form which makes this mass of interesting information accessible to all. English-speaking practitioners are now provided with an authentic and comprehensive account of the essential features of dental history covering all that is known of the subject. The importance of this record cannot be overestimated in its educational aspect.

The book will be read from two points of view—first, by the reader who has a passing interest in the story of dentistry and its development in past ages, and secondly, by those who will make a serious study of the subject from its sociological aspect and its bearing upon professional development. One point among many others which the work makes clear is that the old and generally accepted notion that dentistry is an offshoot from the trade of the barber has but little foundation in fact—no more foundation than that the art of surgery had a similar origin. Both dentistry and surgery, it is true, in so far as they were represented by tooth-drawing and phlebotomy, were practiced by barbers in the early days, and similarly these operations were practiced by mountebanks and itinerant quacks—a practice which even in our own times has not wholly subsided; but on the other hand the historical records show that dentistry in its more serious and, we may say, its professional aspects was practiced as a part of legitimate medicine and surgery by the most skilled and famous representatives of medical and surgical art of their time. Indeed, the most

illustrious of the fathers of medicine and surgery devoted much of their best talent to the study of dental disorders and their treatment. If Dr. Guerini in his historical researches had done nothing more than to remove this stigma of tonsorial origin from the profession of dentistry he would have justified his position as one of the benefactors of our calling, for the popular charge that the dentist and the barber were originally identical has been a bar sinister on our professional escutcheon that has done at least as much as any other one thing to degrade dentistry in public esteem, and has furnished a welcome excuse for the detractors of dentistry to minimize its professional importance.

Guerini's history will, however, perform a more important mission. The teaching of dental history has not been given the attention in our educational curriculum to which its intrinsic value entitles it. Every student of dentistry should possess a fair knowledge of the essential facts in the history of his profession; such a knowledge is not only desirable and necessary as part of the education of an intelligent professional man, but it is essential as the foundation of that proper respect which any man should have for his life pursuit. Too often it happens that the mental attitude of the dental practitioner toward his professional work is apologetic, because he is lacking that respect for his work to which it is justly entitled or fails to regard it in its true light as an honorable and respectable career—in which event he degenerates into a mere money-getting craftsman. The true professional man, the scientific dentist, the artist in dental craftsmanship, is begotten of a sincere love and respect for the worth and importance of his work; and as a means for the development of that kind of attitude toward his life-work no educational means is of greater value to the dental student than the sympathetic study of the history of his profession. It cannot be doubted that this work of Dr. Guerini, which has been produced after so much expenditure of time, labor, and money, and which is now so excellently done, will serve as an impulse to the broader training of those entering the ranks of our profession, and through the influence of those who will have imbibed the effect of its teachings of a higher professionalism will do much to improve and uplift the general level of dentistry in all of its relations. The work itself marks an epoch in dental history.

BIBLIOGRAPHICAL.

A HISTORY OF DENTISTRY FROM THE MOST ANCIENT TIMES UNTIL THE END OF THE EIGHTEENTH CENTURY. By DR. VINCENZO GUERINI, Cav.Uff. Published under the auspices of the National Dental Association of the United States of America. Large 8vo, 356 pp., with 104 engravings and 20 plates, \$6.00. Philadelphia and New York: Lea & Febiger, 1909.

Every dentist who has ever given any thought to the development of his profession must have realized the growing necessity for an accessible and authoritative history of the dental art. The early efforts in this direction by Duval, Fitch, Carabelli, Snell, Linderer, Harris, and others, followed in this country by the more recent essays of Perine, Dexter, and Cigrand, are out of print and difficult to obtain. The "Geschichte der Zahnheilkunde," by Geist-Jacobi, and "Notice sur l'Histoire de l'Art Dentaire," by Lemerle, have given to the practitioners of Germany and France valuable information which the English-speaking dentist has often sadly lacked. Realizing this situation, at the first meeting of the National Dental Association, the late Dr. R. Finley Hunt offered a resolution—"That a committee be appointed to report a measure looking to the preparation of a full history of the dental profession."

After several years the committee was able to report that Dr. Vincenzo Guerini of Naples, Italy, had written a history of dentistry from the earliest times to the

beginning of the nineteenth century, and that this work, translated into English and fully revised, had been generously placed in the hands of the committee for publication under the auspices of the National Dental Association, in token of the distinguished author's appreciation of American dental development. The publication of the book was subsequently arranged for, no lesser authorities supervising the work while it passed through the press and the correction of proofs than Dr. Edward C. Kirk and the chairman of the committee, Dr. Charles McManus, who prepared the index. By them such interesting notes have been added to the body of the work as those on Egyptian dental art, page 28, on dentistry in the Homeric age, page 45, on Galen's writings, page 106, on the earliest German "Artzney Büchlein," pages 164 and 165, on the famous German story of the "Golden Tooth," page 217, on early German works treating on the eradication of imaginary dental worms as a cure for toothache, pages 307 and 308, etc.

Dr. Guerini, to whom credit is due not only for having written a history of dentistry, but *the* history of dentistry, has succeeded in his aim to produce a work which should be more complete, more circumstantial, and more exact than those published hitherto, and which, instead of being, as are many of these works, simply a compilation, should represent the fruits of personal research and scrupulous examination of works of various kinds containing elements utilizable for the pur-

pose. This his aim he has approached so closely that there is no longer any excuse for the habitually non-reading dentist not familiarizing himself with the beginnings of his art, and the fascination which emanates from every one of these splendidly written and elaborately illustrated chapters leaves on the reader's mind the impression of pride in

his chosen profession and of inspiration toward the highest aims. No man can peruse the record of the efforts of the founders of dentistry as set forth in Dr. Guerini's book without developing a higher appreciation of their work and a keener realization of the worth and dignity of the calling which they in common with ourselves followed. R. H. R.

REVIEW OF CURRENT DENTAL LITERATURE.

[*Schweizerische Vierteljahrsschrift für Zahnheilkunde*, No. 1, Zurich, 1909.]

ELECTRO-DEPOSITION FOR PLATINIZING BRIDGE-SADDLES AND ARCHES. BY DR. WILHELM THIERSCH.

Frequently under the most perfectly constructed gold saddles a slight irritation of the gingivæ is observed, while under platinum the conditions remain always normal. Platinum is, however, much more difficult to swage than gold. This difficulty the author has avoided by first swaging a saddle of platinum plate of 0.15 mm. thickness, to which he soldered a second saddle of 22-karat gold. As this procedure is complicated by considerable difficulties, the author chanced upon the idea of building the bridge of gold and of subsequently platinizing by electro-deposition the portions which are to come in contact with the gingivæ. The following formula yielded excellent results: 5.8 grams of platinum give 10 grams of platinum chlorid. The platinum is rolled out as thinly as possible, cut in small pieces, and dissolved in about 50 cubic centimeters of aqua regia. The excess of acid is driven off in a water-bath. Platinum is dissolved in boiling aqua regia, which during its evaporation must be continually renewed until all the platinum is dissolved, when the aqua is entirely driven off. Finally a dry crystal mass of yellow or brown color remains, which is taken up in distilled water. Solution 1: Aqua destillata 1 liter, ammonium phosphate 20 grams, phosphate of

soda 100 grams, platinum chlorid 4 grams. Solution 2: 4 grams of platinum chlorid in 1 deciliter of aqua destillata and 20 grams of ammonium phosphate in 2 deciliters of aqua destillata. Both solutions are poured together under stirring, when a yellow precipitate of platinum-sal-ammoniac is noted. To this mixture a third solution is added: 100 grams of phosphate of soda in 7 deciliters of aqua destillata, and the whole is boiled until the precipitate has disappeared and on stirring no odor of ammoniac is noticeable. At first the evaporating water is replaced; after the ammoniac odor has disappeared, the whole mixture is condensed to about one and one-half liters. The platinizing is done under heat, though even at tepid temperature excellent results may be had. This is important, since, if only portions of the bridge are to be platinized, the other parts must be covered with sticky-wax. By this method the most complicated saddle bridge can be finished in less than half the time required for swaging it in platinum plate, and in ten minutes the desired portions are covered with an absolutely solid and beautiful layer of pure platinum.

[*Deutsche Zahnärztliche Wochenschrift*, Berlin, March 20, 1909.]

PORCELAIN FILLINGS. BY DR. C. WOLFF.

The enthusiasm with which the silicate cements have been received by the dental profession has forced the technique of porcelain fillings into the background of interest.

Since the silicate cements have proved themselves to be far from ideal in regard to permanence of color, smooth surface, and adaptation to the cavity edges, the author is justified in giving some suggestions in regard to porcelain technique.

For making the matrix, Dr. Wolff uses platinum gold foil No. 30, which after annealing is pressed into the cavity with small cotton pellets and smoothed out at the edges with a piece of spunk. A small strip of rubber dam is spread over the cavity, held with the left hand, and the foil is vigorously burnished against the bottom of the cavity and its edges with flat and ball burnishers. The foil is not misplaced, owing to the tension of the rubber dam, and the matrix is absolutely accurate without the least fold. If the cavity is very deep or undercut, and the interstice is very small, the bottom or, in the latter case, the sides of the cavity are lined with a little gutta-percha, which is removed before the final insertion of the inlay, or may be left in, if it serves to protect the pulp. In large fillings the foil is allowed to freely overlap the edges on all sides, so that it can be seen from the impression what shape the filling is to have. If corners are to be built up, a wax or gutta-percha model is made, which serves as a guide in baking the inlay. If an approximal cavity reaches to the gingiva or below, the excess of foil is folded over, and after it has been adapted in the depth of the cavity, folded back upward over the neck of the tooth with a suitable instrument. If the cavity goes very deeply under the gingiva, it may be filled with amalgam up to the gingival edge in order to secure perfect marginal adaptation of the porcelain inlay. In order to avoid excessive fusing in the electric furnace, the author uses a Bunsen burner. The impression is first heated from the outside until the built-up porcelain mass has become entirely dry, when the porcelain is gradually moved from the broad part into the point of the flame. The porcelain is thus quickly fused, the individual layers of porcelain being heated only until the porcelain barely fuses, and only the last layer is allowed to flow freely. In this way in contour fillings the built-up edges do not flow away so easily. The color is not changed, even if the finished inlay is left in the flame for some time. This method offers real advantages over the fur-

nace. The inlay can be finished much more quickly, because the porcelain fuses more readily, and is also warmed up and cooled more rapidly. The color is not burned out, and the inlay can be watched more conveniently than in the furnace. In order to securely anchor large contour fillings, as in incisal edges or bicuspid cusps, a thin platinum wire is baked into the filling. After the canal is treated, and the matrix has been burnished into the cavity, a small platinum wire taken from a burned-out electric bulb, one end of which has been bent to a small loop, is introduced into the root-canal through the matrix until the loop touches the matrix, and is then removed on the wax model together with the matrix. For the same purpose a platinum pin may be used, care being taken to apply at first only a very thin layer of porcelain, as the portion around the pin easily becomes porous. Porcelain inlays very successfully resist the stress of mastication in bicuspids, and it happens more frequently that a small piece of the enamel edge is chipped off than that the inlay is injured. It is therefore wise to leave the cavity with as broad an enamel edge as possible. Porcelain fillings are further used in window crowns. After the ring for the gold crown has been fitted, the window is cut out so that no gold will be visible from the outside. Then the bite is taken, and the crown finished and inserted. Before the cement has hardened, a box-like cavity is made in the same, according to the shape of the window, for the reception of the porcelain inlay. As the cement darkens the color of the inlay, a somewhat lighter shade of porcelain is chosen. The porcelain can be ground with carborundum paper disks, and this is sometimes inevitable, but does not impair the inlay. The inlay is fastened in the tooth with a quickly setting cement thinly mixed. The inlay is held under strong pressure until the cement begins to harden. If at all possible, the rubber dam is used in inserting the inlay.

[*Deutsche Zahnärztliche Wochenschrift*, Berlin, April 24, 1909.]

NON-TOXIC ANESTHESIA. By Dr. E. ECKSTEIN.

It is a well-known fact that all the modern preparations for local anesthesia are more or less toxic. The author has therefore tried an

absolutely non-toxic local anesthetic in about 300 cases, viz, spiritus ætheris compositus, Hoffman's anodyne. If 4 ccm. of a 30 to 50 per cent. solution of this remedy in distilled water are injected in the region of the mandibular nerve, the teeth of that half of the mandible become absolutely insensible after from ten to fifteen minutes. This anesthesia extends also over the respective half of the tongue to the middle of the chin. The needle of the syringe, which is held obliquely toward the middle of the chin, is inserted at a point about 1 ccm. above and beside the masticating surface of the third molar, remaining in constant contact with the mandibular bone. The needle penetrates millimeter by millimeter while discharging some drops of the anesthetic. The bulk of the fluid is deposited near, that is to say, above, the mandibular nerve. The syringe should always be held obliquely toward the opposite corner of the mouth and parallel to the masticating surface of the molars. In children 4 ccm. of a 30 per cent. solution are applied. Very robust individuals require from 4 to 5 ccm. of a 50 per cent. solution. In order to avoid a slight burning pain, inject very slowly. The needle must be at least 25 mm. long, and in individuals with large heads about 40 mm. After the injection the patient is requested to lean the injected side of the head sideways, and to keep it in a horizontal position for from ten to fifteen minutes, so that the liquid lying over the nerve may assert itself. First, half of the tongue becomes numb, then half of the lower lip. As soon as the patient declares that he can only hear the percussion of the teeth on the anesthetized side but not feel it, the opportune moment for the extraction has arrived. The anesthesia of the mandible lasts from fifteen to thirty minutes. No untoward symptoms of any kind whatever have been observed, and the anesthetic effect is certain in all cases, if the injection has been executed correctly. The author has tested his method only in the mandible, but since a wad of cotton saturated with a 25 per cent. solution of spiritus ætheris compositus inserted in the nostrils and left there for from ten to fifteen minutes produces anesthesia of the nasal cavity, the upper front teeth, and the front part of the gingiva, it is reasonable to expect that in any part of the body in which, according

to anatomical conditions, the peri-neural injection of a nerve branch is possible, temporary anesthesia of the portion of the body supplied by that nerve is possible. Note that the thinnest hypodermic needle is to be used. The place of injection is painted with carbolic acid for the sake of antiseptis and painless insertion of the needle.

[*Lancet*, London, May 15, 1909.]

TWO CASES OF TRAUMATIC SEPARATION OF THE MAXILLA. BY DR. WILLIAM BLIGH.

Both cases cited were due to accidents in runaways. The first patient, a man of forty-one years, was not concussed, but bled freely from the nose and mouth. His entire upper jaw was freely movable both laterally and from before backward, the entire maxilla being apparently hinged on to the articulations of the nasal processes of the two maxillæ with the frontal bone. The hard palate, the nasal bones, and the nose all moved in one piece with the two maxillæ. There was no escape of cerebro-spinal fluid, no sign of brain injury, no hemorrhage into either orbit, or interference with the lacrymal ducts, and very little pain or extravasation into the soft parts. In fact, the patient was so little hurt that he exhibited his new accomplishment of wagging the whole front of his face to and fro with no little pride and humor.

Treatment consisted in keeping the lower jaw firmly pressed against the upper with a plaster bandage, and gentle syringing of the nasal cavities and washing out of the mouth with an antiseptic wash. The range of movement in the maxilla steadily became less and less, and within from three to four weeks the jaw was firmly fixed once more. Some not very severe neuralgia of the right infra-orbital nerve, probably produced by pressure of callus, came into evidence at the end of the second week, and lasted for about a fortnight.

The second patient, a woman of thirty-three years, was concussed but not deeply unconscious—in fact, in a typical state of cerebral irritability. There was fairly free hemorrhage from the nose and mouth, the upper left central incisor was found loose inside the cheek, and the other upper left incisor had been knocked out. Several teeth on the left side of

the lower jaw were much loosened, the lower left central incisor was hanging quite loose, and the lower right central incisor was turned almost completely round its socket. The lower jaw, however, was not broken. The maxilla was quite loose in one piece and could be moved freely laterally and from before backward, hinging upon the articulations of the nasal processes of the maxillæ with the frontal bone, in which position crepitus could be readily detected. The soft parts of the face and the eyelids were much swollen from blood extravasation. The nose and the palate moved with the maxilla. On the next day the face was enormously swollen, neither eye could be opened, and the general aspect was that of a more or less shapeless pudding. There was no escape of cerebro-spinal fluid and no paralysis of nerves, but oozing of blood from the anterior and posterior nares continued for days. As soon as the eyelids could be opened much subconjunctival ecchymosis could be seen, but it was not wedge-shaped and evidently came from the eyelids, not from a fracture involving the anterior fossa of the skull.

The condition of moderate concussion continued for several days, but no symptoms worthy of anxiety supervened, the swelling of the face gradually lessened, and the maxilla steadily became more fixed, so that three weeks after the accident the jaw was nearly immovable. On account of the state of the mouth and teeth no attempt was made to fix the fracture; the jaw was gently pressed into good position, and antiseptic washes were used.

The exact line taken by these fractures posteriorly was not determined. The malar arches in each case were intact, the separation taking place at the junction of the malar processes of the maxillæ with the maxillary borders of the malar bones. In both cases the separation above took place at the articulations of the nasal processes of the maxillæ with the frontal bones, so that the maxilla, carrying the nasal bones with it, hinged upon the root of the nose just below the glabella. The second case, which healed though no treatment was instituted aiming at steady-ing the fracture, shows how kind nature is to wounds about the face, owing to the plentiful blood supply. The mobility of the maxilla rapidly diminishes and union becomes firm without any aid from the surgeon.

[*Journal of the American Medical Association*, Chicago, June 19, 1909.]

THE FAUCIAL TONSILS AND THE TEETH. BY DR. G. H. MAKUEN.

Tonsillar disease is so insidious in its origin that in most instances it goes unrecognized until the damage to the neighboring organs and even to the general health of the patient is almost irreparable. The tonsils and the teeth are alike at least in this one respect, and the time to cure either is before the disease begins. The function of the normal tonsil is still a subject of discussion. We know, however, that a diseased tonsil is not only a menace to the general health, but a source of local infection to the oral cavity, harmful alike to the mucous membrane lining that cavity and to the teeth which we are striving so hard to preserve.

Diseased faucial tonsils affect the teeth in three ways: First, they interfere with the general health of the patient and thus with the proper nourishment of the teeth. Second, they contribute very largely to the local invasion of the teeth by the numerous bacteria which emanate from their crypts. Third, they interfere by pressure with the alignment of the teeth and with the normal development of the maxillary bones.

Cervical adenitis, whatever may be the specific character of the infection, may in the majority of instances be traced directly either to diseased tonsils or teeth, or to both of these sources combined. Moreover, since the efferent lymphatics drain into the venous circulation, we have an explanation of the anemia and other symptoms of blood impoverishment which always accompany diseased tonsils and teeth. The diseased tonsil or tooth transmits its infection through the cervical glands and lymphatics to the circulation, impoverishing the blood, which, on its return, fails to nourish the tonsils and teeth properly, and thus disease of these organs is further extended. Furthermore, a diseased faucial tonsil is usually more or less catarrhal in its character, and its secretions are often filthy in the extreme. The oro-pharynx is thus kept bathed in infectious secretions, and as a result the teeth naturally suffer. In a similar way the normal tonsil may be affected by infectious material from diseased teeth. Hypertrophied tonsils may also affect the teeth by

pressure of the glands on the posterior molars and on the ends of the alveolar arches. The palatal half-arches present a marked bow-shape, the posterior one being crowded backward against the lateral portion of the post-pharyngeal wall, interfering with normal nasal breathing, and the anterior one being crowded forward against the molar teeth and their alveolar processes, this latter pressure being alternately increased and diminished by the acts of articulation, mastication, and deglutition. Whether the tonsils cause mouth-breathing and the resultant dental irregularities, or whether the dental irregularities cause the mouth-breathing and the resultant tonsils, is still a much mooted question. At all events it is necessary to promptly destroy their disastrous cumulative effects. We cannot cure mouth-breathing and its disastrous results in all cases merely by the removal of tonsils and adenoids. When there are dental irregularities which render it impossible, difficult, or even a little inconvenient to close the mouth, something more than tonsillectomy and adenoidectomy must be resorted to. Mouth-breathing cannot always be cured by rendering it possible or convenient to close the mouth, but the naso-pharyngeal and oropharyngeal cavities must be made free for the passage of the breath currents, else the breathing cannot be normal, nor indeed can the dental arches long remain normal, at least in young children. It is therefore indicated to eradicate all glandular obstructions to the normal development of the teeth and the alveolar arches, prior to any attempt at remedying the structural defects of these organs. The diseased tonsil is not worth preserving, because it has lost its usefulness and has become a menace to the human economy. The only rational remedy for diseased tonsils is total extirpation.

[*L'Odontologie*, Paris, February 28, 1909.]

CALCIUM FLUORID IN DENTAL THERAPEUTICS. BY DR. J. MIRAN.

If in a human tooth, which is composed of organic and calcareous elements, the organic elements predominate, that tooth is particularly predisposed to dental caries, while a predominance of the calcareous elements imparts to the tooth a certain degree of immunity. Scarcity of mineral salts in some teeth is due to physiological and pathological reasons.

In women, gestation and lactation deprive the osseous, nervous, and dental systems of a great many mineral elements, women therefore being less immune to caries, and sometimes falling victim to veritable catastrophes of the dental system. Besides these physiologic causes certain particular conditions of life favor dental decalcification. During the age of puberty in both sexes the daily diet is often not suited for supplying the system with the necessary amount of inorganic material. Moreover, the strain imposed upon young people about the twenties, when they have to undergo the most important examinations that frequently determine their subsequent career, singularly coincides with the frequency of dental caries observed at that age.

The pathological causes embrace all diseases that more or less impede assimilation or produce dissimulation, *i.e.* anemia of various intensity, tuberculosis in all its forms, and syphilis.

On this demineralization, Dr. Brissemoret writes in the *Bulletin Général de Thérapeutique*, July 30: "The fresh human bone contains from twenty-nine to fifty-seven per cent of its own weight of mineral matter, and after calcination, represents a mixture of chiefly tricalcic phosphate, together with phosphate of magnesia, calcium carbonate, and calcium fluorid. The last plays a definite physiological part. It is a precious cement, which by uniting the particles of carbonate and calcium phosphate and magnesia, of which the animal skeleton is chiefly built up, imparts to it a durability and solidity which it otherwise would not possess. In order to assure the resistance of the enamel, nature accumulates mineral fluorids in these masticatory organs. Our organism eliminates every day an appreciable quantity of calcium fluorid, from 0.003 to 0.005 gram. Man takes in the necessary supply of these salts in his drinking water. If his diet does not restore the losses in fluorid, nutritional disturbances quickly arise. It is the lack of fluorid in the diet that constitutes one of the main causes of dental caries in its various forms." For such cases Dr. Brissemoret prescribes calcium fluorid. He reports one case of a young man whom he had under observation for several years, and who suffered from periodical attacks of caries. After the

administration of 5 mgm. of calcium fluorid per day for two weeks a month, considerable improvement was noticed after six months' treatment. For children during the period of growth, for adults with dental caries, in tuberculosis, for stimulating the remineralization of the organism, in fractures for hastening the solidification of the callus, for women during gestation and lactation, he prescribes calcium fluorid in powder form as follows:

Calcium fluorid,	0.075 gram;
Potassium phosphate,	3 grams;
Sodium phosphate,	5 "
Magnesium phosphate,	10 "
Dicalcium phosphate,	10 "
Sodium citrate,	15 "
Lactose,	q.s. ad 100 "

One-half teaspoonful twice a day at meal-times.

For stimulating the formation of callus in fractures, the following formula is recommended:

Calcium fluorid,	0.05 gram;
Magnesium fluorid,	0.02 "
Calcium bromid,	2.50 grams;
Dicalcium phosphate,	5 "
Calcium carbonate,	5 "

In 20 powders. Two per day.

[*Bull. du Syndicat des Chirurgiens-Dentistes de France*, Paris, February 1909]

DIAGNOSIS OF CARIES BY THE AID OF THE PULP REACTION UNDER JETS OF WATER OF DIFFERENT DEGREES. By DR. G. SCHWARTZ, JR.

Every dental practitioner has experienced surprise at the different reactions observed in teeth with caries of the same degree. The author, without going into the causes of these different reactions, has noted the differences in a statistical way. He divides the water jets in three categories: Hot: From 40 to 60° C. Tepid: From 20 to 40° C. Cold: From 12 to 20° C. The degrees of pain are noted as follows: Very painful. Painful. Sensitive. Insensitive. His results were: Teeth with—

Caries of second degree (110 teeth).

Under hot	jet	.....	50	insensitive
"	tepid	"	80	"
"	cold	"	40	painful
"	"	"	40	sensitive

Advanced second degree (160 teeth).

Under hot	jet	.....	30	insensitive
"	"	"	30	sensitive
"	tepid	"	110	insensitive
"	cold	"	120	painful

Third degree (50 teeth).

Under hot	jet	.....	30	painful
"	"	"	20	sensitive
"	tepid	"	40	"
"	cold	"	40	painful

From these observations the following general conclusions may be reached:

(1) There is no difference in susceptibility to pain between upper and lower teeth.

(2) Multi-rooted teeth appear more sensitive to extreme temperatures than single-rooted teeth.

(3) Teeth with caries of the second degree appear a little more sensitive to cold than to hot. Teeth with caries of advanced second degree appear much more sensitive to cold than to hot. Teeth with caries of the third degree appear more sensitive to hot than to cold.

(4) Cold has a satisfactory effect only on teeth with far advanced caries of the second degree or beginning third degree, and in cases of congestion of the pulp and subsequent hypertrophy.

(5) Pain on burring seems to correspond to pain produced by temperatures.

(6) Nervous subjects resent extreme temperatures more strenuously.

(7) Pain is felt with a cold jet from 20° on, with a hot jet from 40° on.

(8) In cases of caries, invisible or inaccessible to the sound, the response to water jets of different temperatures may yield useful indications.

[*Revue Générale de l'Art Dentaire*, Paris, February 1909.]

ANGINA OF DENTAL ORIGIN. By DR. A. BARDEN.

Reflex angina of dental origin is simply the reflex action on the pharynx of an irritation starting in the gingivo-dental region. In regard to symptoms it does not differ from any other erythematous angina. That is, it may simply produce redness, like erythematous angina proper, or be accompanied by a glandular exudation, like catarrhal angina, or it may lead to epithelial desquamation, pultaceous

ous angina. It has, however, been generally overlooked that angina is originally a deep-seated muscular phenomenon, and secondarily a superficial mucous one characterized by redness, edema, or exudation. In the first stage, angina is characterized by pain without any other visible symptoms. This phase may last from one to four days, and need not necessarily be followed by inflammation of the mucosa. Overlooking one important symptom, the dysphagia of the patient, many diagnosticians fail in recognizing this initial phase of dental angina. Dental affections, eruption of teeth, alveolitis, or alveolo-dental arthritis may well produce angina by way of reflex. The proofs advanced by the author are of chronologic, topographic, sympathetic, etiologic, experimental, and therapeutic nature.

The co-existence of dental affections and angina is frequently observed. If the angina precedes the dental crisis, it is only by a few hours; if it succeeds it, it does so within one or two days. Most frequently the dental crisis is contemporaneous with the pharyngeal one. In one of two cases cited the symptoms of angina had preceded the dental affection, in the other it had promptly followed it, indorsing the author's contention of a co-existence of pharyngeal and dental affections. Concerning the relationship between angina and bucco-dental pathology, the so-called periods of angina should not be overlooked. Angina is a disease of infancy and of the period of from eighteen to twenty-five. During the period of infancy, angina coincides with the eruption of the molars and with the frequent deep caries of the first molar; at the ages of from eighteen to twenty-five, with the eruption of the third molar.

Whenever angina is of dental origin, it is observed to be localized on the same side as the dental lesion, unilaterally, or, if there are dental lesions on both sides, bilaterally. Again the author cites typical cases.

As for sympathetic symptoms, a whole syndrome of reflexes may be observed. Among phenomena of sensitiveness, neuralgia, cutane-

ous hypersensitiveness, and latent hypersensitiveness at the foramina whence the nervous trunks emerge, are to be noted. Among thermal reactions, generally hyperthermia is observed, among vaso-motor phenomena erythrosis, among fluxionary symptoms coryza, among trophic phenomena diffuse depilation, alopecia. If, on the one hand, it has been demonstrated that alopecia may be of dental origin, and if, on the other hand, it has also frequently been observed that alopecia was preceded by a crisis in angina, one may well arrive at the conclusion that angina and alopecia are two distinct reflex modifications of dental irritation.

By way of etiological proof it is known that facial neuralgia in a great majority of cases is due to dental affections, among which abnormal dental eruption, alveolo-dental arthritis, pulpitis, and alveolitis take first place. The author's statistics on the dental causes for angina show that among ten cases of angina six were due to dental eruption, two to alveolo-dental arthritis, one to acute pulpitis, one to alveolitis.

The assumption that dental affections are among the most irritating that produce pharyngeal phenomena is indorsed by a case of extraction of a lower right first molar affected with alveolo-dental arthritis. A violent post-operative alveolitis set in, together with a typical angina on the right side, which subsided as the dental irritation gradually disappeared.

A therapeutic proof for the simultaneous cessation of dental and pharyngeal phenomena—though the coincidence cannot be expected to be infallibly mathematical—was furnished in a case of acute pulpitis of the lower left second bicuspid and co-existing considerable dysphagia and slight redness of the tonsils on the left side, the extraction of the tooth producing prompt relief from the pharyngeal symptoms.

The author justly believes that it would be hard to find a more complete series of convincing proofs for the correlation of dental irritations and angina.

PERISCOPE.

Syphilitic Ulcers in the Mouth.—A saturated solution of iodine crystals in beechwood creosote is an excellent remedy for syphilitic ulcers of the mouth. This preparation also works wonders in other than these particular lesions.—S. S. CARLETON, *Dental Digest*.

A Safe Method of Adapting Wax Inlay Models.—When the cavity is filled with wax, stretch a piece of thin rubber dam over it and draw tightly. Both ends of the rubber can usually be held by the fingers of one hand in such a way that the tension will force the wax into the cavity. Burnish through the rubber till all margins are adapted and all but the finest carving of the wax has been done.

In approximal models, separation must be made between the wax and the adjoining tooth, preferably with a thin ribbon-saw. If it is necessary to build additional contours, add beeswax to the finished model.—E. S. ULSAVER, *Dental Digest*.

Restoring Teeth for Crown and Bridge Work by Casting.—No doubt every dentist has a method of his own for restoring teeth for crown and bridge work, but the most simple way is possibly that of casting by the following method: First, see that the roots are in a good healthy condition, then prepare the canals for the pins, place the pins in position, warm some wax, build up and shape the wax model in order to fit the crown over the same, cut down the wax model so as to form a slight shoulder on which the crowns rest; this can be done after casting, if desired; withdraw the pins with the wax model, invest, and cast. Finish up the cast as desired; make the band as for an ordinary gold crown, soldering a piece of gold over the end of the band. Cement the cast in position, then place the band over the cast, place warm inlay wax on the band, have the patient bite to obtain perfect occlusion, then carve up the cusp, remove the crown and cast the cusp; finish up the crown and cement it in place, and you will have a tooth that will be serviceable in every way.—C. JENSEN, *Dental Summary*.

Method of Securing a Uniform Soft Rubber Base in Lower Dentures.—A uniform distribution of hard and soft rubber is often difficult to obtain. To do away with this difficulty, put a layer of tissue paper on the wax pattern that is generally laid on the model. Then the wax is built up as usual, and the teeth are set up. The piece is then invested in the flask. After vulcanizing, the flask is separated, and the upper portion removed. Then the layer of wax is removed as far as the tissue paper, and the upper portion poured once more. Thus we obtain two upper portions for one flask, first the entire upper portion, second the same portion minus the wax layer. Ordinary rubber is packed and pressed with the second upper portion, thereby obtaining a hollow space which corresponds exactly to the wax layer. Soft rubber is then packed and pressed with the first upper portion in place and vulcanized, securing a uniform layer of soft rubber.—MAX ORDOVER, *Deutsche Zahnärztliche Zeitung*.

Finishing Gold Fillings.—Take a couple of approximal gold fillings, to illustrate the most approved method of finishing as follows: Trim the fillings on each side—buccally and lingually—with suitable disks, rotating them toward the occlusal so that there will be no chance of their catching and going in a flash over in between, and shape up as far as possible without allowing the disk to pass in between. Finish cervically with burnisher and trimmers until a narrow strip can be passed through, and use these not straight, but on the curve of the tooth at the cervical border. Then work cautiously toward the contact point, but not through between. After everything is done but the one little point of contact, use a thin spatula and pass it between; follow with a thin-bladed burnisher, working all around condensing as much as may be done. Follow with fine polishing strips—do not cut—and go over and through until the polish is satisfactory. The contact point will be as intended, or at least without any undesired flattening. It takes but little more time to finish up in this way, and the patient gets better service.—R. B. TULLER, *American Dental Journal*.

The Cast Clasp.—The cast clasp is the proper and most accurate clasp that can be made. After securing a perfect cast from a plaster impression, proceed to burnish No. 40 tin around the teeth to be clasped, which will keep the wax from adhering to the plaster tooth; then take inlay wax, press it around the tooth, and carve it to the desired shape. Attach a small piece of wax for a lug, remove it, place it on the sprue wire, and invest; use regular clasp metal for casting. Cement the clasps on the case before setting up the teeth, to hold them in position.

By using this method you will have a denture that, when inserted, will give a very pleasing result; it will not spring, but will be absolutely firm.—W. B. CALDWELL, *Dental Summary*.

Cementing Inlays.—If you examine a metal inlay that has come out, as a rule it will be found that the cement has broken its attachment with the tooth substance and is still adhering to the gold. This was probably due to imperfect drying of the cavity at the time of setting. The cavity walls should be thoroughly dried to insure adhesion of the cement thereto. This adhesion can be very much increased by wiping the cavity out with a little of the cement liquid and drying just before setting. This seems to prepare the surface for a stronger adhesion of the cement. We have seen the cement cling to the instrument rather than to the cavity walls at times. This is due to faulty drying out of the cavity. If it is difficult to secure the most perfect dryness, it is all the more important to use the liquid method before setting.—L. E. CUSTER, *Dental Summary*.

Restoration of Broken-down Roots of Bicusps and Molars by the Casting Method.—This method applies principally to bicusps and molars which are badly decayed or broken down, or where by accident one cusp has been broken off, the break extending under the gum line, and a portion of tooth remaining.

First, after the canals are placed in proper condition, pack the space tightly with some good temporary stopping, and allow it to remain a day or two. On removing, the margins will be exposed, and the root can be shaped without injury to the surrounding tissues. The root should be shaped in the most retentive form, leaving a portion of the remaining cusp for strength where possible.

A post may be used in the canal, but usually, it being so short, an impression of gold, making the whole in one, is advisable. After the root is shaped, an impression of the

latter with inlay wax, extending into the canals, and properly trimmed to the margins, is taken, invested, and cast. This assures perfect adaptation to the root.

The sprue is then cut off, the part is fitted into the root, an impression taken in plaster or compound, a model made and the selected tooth built into place with inlay wax, allowing it to extend over the lingual cusp in a sort of hood shape to give strength and retention, and then carving it to perfect occlusion.

After the tooth is waxed in position, the model is trimmed as small as possible and invested again, put on the fire and allowed to heat slowly but to a high degree, so as to assure its uniting to the cast base and less liability of fracture to the porcelain, and then cast.

If the model has been well shaped and smoothed, it will require but little polishing and make a very strong, esthetic crown.—A. W. McCULLOUGH, *Dental Summary*.

Acute Ulcerous Gingivitis.—A comparatively rare disease of the mouth, which might be called acute ulcerous gingivitis, attacks simultaneously at the gum margins the buccal or labial surfaces of about two, three, or possibly four teeth only. These ulcers seemingly come suddenly, quickly destroying the gingivæ down to the alveolar process, but seemingly not invading it, baring the roots of the teeth to this extent. The margins of the ulcers are everted crater-like, somewhat similar to chancreous ulcers. The bases of the ulcers are overlaid with a grayish white covering. When this covering is removed, the granulating surface bleeds freely. The lymphatics related to the area become enlarged, and unlike chancreous lymphatic enlargements, are tender. They are also unlike chancre in that the ulcers are exceedingly painful to touch. Salivation is much increased, the breath is fetid, and, owing to the absorption of toxic elements, there is a slight rise in temperature. The contiguous lingual gingivæ become reddened, but do not participate in the ulceration. The condition has been mistaken for syphilis. It persists under ordinary antiseptic washes, but yields promptly to local applications combined with small doses of mercurous chlorid frequently repeated. The ulcers should be cleansed with hydrogen dioxid and the granulating surfaces protected by painting them with compound tincture of benzoin. When the ulceration is controlled, the gum tissue destroyed is soon fully restored by granulation, leaving no evidence of the ravages of the disease.—T. L. GILMER, *Dental Review*.

Root-Canal Points.—My method of making the different root-canal points is as follows:

First: Pure tin points, made from No. 60 tin foil by cutting the tin into pointed or V-shape strips and rolling them into points.

Second: Same as first, except that the tin point is coated with sandarac varnish and then rolled with a V-shape strip of No. 4 gold foil. The gold adheres very closely to the tin and makes virtually a gold point.

I claim that the tin-and-gold are ideal canal-points; they are antiseptic, make a valuable canal-filling and fill the root to the apex.

Third: Gutta-percha points, shellacked and rolled with tin foil, which makes a complete tin covering.

Fourth: Same as third, except that the tin point is coated with sandarac varnish and rolled with gold foil; this makes a good combination point. It has the virtue of both gutta-percha and metal; the metal carries the gutta-percha to the apex.

Fifth: Gutta-percha points, shellacked for the purpose of making them stiff and firm.

These points can be made of any size, from the smallest to the largest. I also recommend the use of chloro-percha with the points. These canal points are easily and quickly made; they are certainly very fine and something new in the preparation of materials for root fillings.—GUSTAVUS NORTH, *Dental Brief*.

Silicate Cements.—The silicate cements seem to resist the action of the fluids of the oral cavity better than their predecessors, but time has shown that they are not insoluble and that they do slowly wash away on their exposed surfaces. For this reason they cannot be regarded as permanent fillings, and patients should not be allowed to consider them as such. Their peculiarly natural appearance makes them very attractive and desirable, but they should not be permitted to supersede porcelain inlays, for they possess neither the beauty nor the permanence of porcelain.

When it is desired to insert a filling that

shall be next to porcelain in naturalness, and is intended to serve its purpose for a time, the silicate cement is indicated. In the anterior teeth of the deciduous set, or in the teeth of adults where the tooth-structure is of such a character as not to be able to resist the influence of caries, silicate cements find their field of greatest usefulness. In cases also where large restorations are demanded in the anterior teeth, on surfaces removed from occlusal strain, and when porcelain inlays are beyond the means of the patient, the silicates can be employed to great advantage.

Teeth greatly weakened by caries, where it may be desired to avoid the more elaborate operation of crowning as long as possible, may be made presentable and even strengthened by silicate fillings. While, as has been said, fillings of this type cannot be classed as permanent, their life may be greatly extended by giving attention to certain details of procedure. Among these are the proper shaping of the cavity; its protection from moisture both before and after the introduction of the material; thorough mixing of the cement and its prompt though careful placement, and finally, after the surface has been made to conform to the contour of the tooth, the flowing of melted paraffin over its surface. If after applying the paraffin it is gone over with a hot burnisher several times, the cement will absorb sufficient of the melted material to render it impervious to moisture, and at the same time the translucence and life-like appearance of the filling will be increased.

Like every other filling material, the silicate cement has its appropriate place. Used with discretion and with due regard for the existing conditions, there is no reason why it should not find a permanent place among the list of tooth-preservatives. The great danger lies in the probability of its being employed too frequently and in cases where other and more permanent materials would serve a better purpose.—S. H. GUILFORD, *Garretsonian*.

OBITUARY.

DR. AMOS W. FRENCH.

DIED, at his residence, 324 West Monroe st., Springfield, Ill., of pneumonia following an attack of grippe, April 27, 1909, Dr. AMOS WILLARD FRENCH, in his eighty-ninth year.

With the death of Dr. Amos W. French, the oldest alumnus of Washington University, St. Louis, and at the same time the oldest practicing dentist in the United States, has passed away.

The decedent was born in Brighton, N. Y., on July 24, 1821. His boyhood was spent in Rochester, N. Y. After being graduated from Washington University, St. Louis, he went to Springfield, Ill., in 1848, where he had been in practice ever since.

Dr. French was a dentist of no mean ability and of wide repute. He was an earnest and public-spirited citizen, taking an active part in the making of Springfield. For many years he was secretary of the Capitol Railway Company, which built the first street-car line in that city. He was elected president of the board of trustees of the Bettie Stuart Institute, and for many years held membership in the board of trustees of the city library. He also was a member of the building committee when the Carnegie library in Springfield was erected.

Dr. French was an enthusiastic collector of old and rare books, and leaves a very large and valuable library. He has written a great many articles and addresses on early life in Illinois, and has recorded in his writings some valuable statistics on the progress of dentistry in that state. He was personally acquainted with Lincoln, and for that reason was elected speaker at the Lincoln centennial celebration at Illinois College, Jacksonville, where he delivered his last public address.

Dr. French in 1851 married Miss Sarah T.

Foster of Rochester, and at the time of his demise was contemplating the celebration of his marriage anniversary. He is survived by his wife and four children—Mrs. James H. Matheny of Springfield, Ill., Mrs. A. H. Lander of Sedalia, Mo., Mrs. W. H. Reeves of Peoria, and Miss Effie French of Springfield, Ill.

DR. ALEXANDER MCKIRGAN.

DIED, at his home, 27 Lenox ave., East Orange, N. J., of heart disease, May 28, 1909, Dr. ALEXANDER MCKIRGAN, at the age of seventy-eight years.

With the demise of Dr. Alexander McKirgan, who was graduated in dental surgery half a century ago, another of the pioneers of dentistry has gone from us.

Dr. McKirgan was born in Lyons Farms, N. J., in 1831, and received his early education in the public schools of his native town. He later entered the dental department of the University of Pennsylvania, from which he was graduated in the class of 1859. He practiced in Amboy, N. J., and in Elmira, N. Y., until 1872; then he went to Newark, where he pursued his profession for nearly twenty years. In 1893 he removed to Paterson, N. J., where he continued in his profession until 1903, when he retired. In 1907 he went to East Orange, N. J., where he has made his home since. Dr. McKirgan was a very skillful practitioner of reputation and stood high in the communities in which he lived. He was a thirty-second degree Mason. He was married in 1860 to Miss Emma I. Bonnell of Newark, who survives him, with one daughter, Mrs. Bertha Marvin.

Interment was made in Mount Pleasant Cemetery.

DENTAL LEGISLATION, ETC.

OPINION BY THE ATTORNEY-GENERAL OF MAINE

RELATIVE TO

Acts of Unregistered Persons Constituting Violation of the Dental Registration Act.

[FOLLOWING is an opinion by the Attorney-general of Maine as to the acts of unregistered persons constituting a violation of the Dental Registration Act of the state of Maine, which we publish by the courtesy of the president of the Board of Dental Examiners of the state of Maine, as being of genuine interest on account of the principle involved.—ED. COSMOS.]

OFFICE OF THE ATTORNEY-GENERAL,
WATERVILLE, ME., July 1, 1909.

Dental Registration Act—Chap. 43, P. L. 1891: Acts of unregistered persons constituting violation of Dental Registration Act—dentist—dental work—laboratory work.

L. S. CHILCOTT, D.D.S., President of Board of Dental Examiners, Bangor, Me.

Dear Sir,—Your favor of recent date is at hand asking for an official opinion as to what extent persons who have not been registered in accordance with the dental law and have not passed a satisfactory examination before our board of dental examiners, may lawfully practice dentistry in this state by being associated with or employed by regular practitioners. You also make as a statement of fact the following: "It is quite generally the practice for dentists to employ assistants in their offices to help them in operating, to do their laboratory work, and to make themselves generally useful." You also cite alleged instances where dentists have employed unregistered men as assistants, allowing them to conduct business on their own responsibility; also where unregistered men have been allowed to open an office and conduct business on a percentage basis in the name of the registered dentist; also instances where registered dentists have been detained from their offices by illness or other causes and have placed unregistered men in full charge of their offices during their absence.

Unfortunately, as it seems to me, the Dental Registration Act of Maine is not as explicit in its terms as occurs in the dental registration acts of many other states.

Our act provides that—"No person shall practice, attempt to practice, or hold himself out to be a practitioner of dentistry or dental surgery, until he or she shall have first received a certificate as hereinafter provided."

The act in question does not attempt to define "dentistry or dental surgery," and our only source of legal definition is in the decided cases of other states which have a dental act similar to ours.

The dental registration act most nearly resembling our own is in the state of Arkansas, and in that state some cases have been passed upon by the courts relative to violations of their dental registration act. In one case the respondent was a student in the office of a registered dentist, and it was alleged that he had violated the dental registration act in two instances—one where he extracted teeth and the other where he filled teeth. For the work of extracting teeth no charge was made; for the work of filling teeth a charge was made, and the student received the benefit of the charge. The question arose as to whether this student was practicing dentistry, or dental surgery, and the court said in discussing the case that it was impossible to escape the conclusion that the *performance of dental work and charging and receiving pay therefor* is practicing dentistry, and that although the relation of student and preceptor existed between the respondent and dentist in whose office he was, yet so far as the dental work was concerned, the charge was not made in the name of the registered dentist nor was the pay received by him, but, on the other hand, the student made the charge for himself and received the pay. Such conduct was declared by the court to be practicing dentistry and to be a violation of the dental act of the state.

Another Arkansas case furnished the fol-

lowing rule of court: "A dental student who performed dental work without a certificate from the board of dental examiners, and received pay therefor, is practicing dentistry."

If our courts, under a statute almost exactly like that of Arkansas, should adopt the views of the Arkansas court (which I am inclined to believe they would), then these would be illustrations of a violation of our Dental Registration Act.

You will observe two distinct elements in these rulings of the court: First, the performance of dental work; second, charging and receiving pay therefor. As the second element is easily understood, we look a little farther to see what the courts and other authorities have said about the first; or, in other words, What is a dentist, and what is dental work?

In a Rhode Island case we find the following: "A dentist is a dental surgeon. He performs operations upon the teeth and jaws, and, as incidental hereto, upon the flesh connected therewith." In a Michigan case the court said, "Dentistry was formerly purely mechanical, and instruction in it scarcely went beyond manual dexterity in the use of tools. A knowledge of the human system generally, and of diseases which might affect the teeth and render an operation important, was by no means considered necessary. Of late, however, as the physiology of the human system has become better understood and the relation of its various parts and their mutual dependence are more clearly recognized, dentistry has made great progress as a science." In a Mississippi case, the court said: "It is true that the practice of the dentist's art requires the use of instruments for manual operation, and that much of it consists in manual operation; yet it also involves a knowledge of the physiology of the teeth which cannot be acquired but by a proper course of study, and this is taught by learned treatises on the subject, and is a distinct, though limited, department of the medical art, in institutions established for the purpose."

Coming closer to the exact definition of "dentist," I quote the following from a North Carolina case: "A dentist is one who performs manual or mechanical operations to preserve teeth, to cleanse, extract, insert or repair them." Another definition, found in a Michigan case, is in the following words: "A dentist is one whose profession is to clean and extract teeth, repair them when diseased, and replace them, when necessary, by artificial ones."

You will observe from these rules and definitions that the tendency of the courts is to

regard laboratory work *only* as not rising to the dignity of doing dental work or practicing dentistry. While the dentist may be, and often is, obliged to do laboratory work, yet his professional standing in courts of law seems to rest upon the fact of his treating the human patient through his skill and knowledge of the human system.

Considering the Dental Registration Act of this state in a general way, in the light of what I have already called to your attention, I feel quite safe in advising you that an unregistered man should not be allowed in this state to operate in any way upon a patient by way of practicing dentistry if he were to receive directly or indirectly as a result of his work any reward, fee, or emolument whatever. You will observe that none of the cases to which I have called your attention seem to forbid an assistant from doing laboratory work or making himself generally useful about an office, providing that he is not operating on a patient or receiving pay therefor either directly or indirectly; and I confess that I fail to see anything in the Maine Registration Act which would render a person liable for conduct of that kind.

Advising in accordance with these principles, it hardly seems necessary for me to say that the specific instances to which you call my attention are in my opinion in violation of the Dental Registration Act of this state, those instances being in substance as follows: The employment of unregistered men as assistants and allowing them to conduct business on their own responsibility so far as the relations between office and patient exist; any arrangement by which an alleged assistant, unregistered, should have the privilege of conducting dental practice on his own responsibility, either on a percentage basis or in return for labor done for his alleged employer; or where a registered dentist, detained from his office by illness or any other cause places his business in full charge of an unregistered man.

In closing, I note your inquiry about the duty of the board of dental examiners to become prosecuting officers by way of instituting complaints against any violator of the act. The Maine Dental Registration Act does not require any member of the board of dental examiners to institute prosecutions against violators of the act. On the other hand, nothing in the act forbids any member of the board of dental examiners from signing any complaint against any violator of the act.

Very respectfully yours,

(Signed) WARREN C. PHILBROOK,
Attorney-general.

DENTAL COLLEGE COMMENCEMENTS.

GEORGE WASHINGTON UNIVERSITY, DEPARTMENT OF DENTISTRY.

THE annual commencement exercises of the George Washington University, Department of Dentistry, were held June 9, 1909, in the Belasco Theater, Washington, D. C.

The degree of Doctor of Dental Surgery was conferred on the following graduates:

Guy Wilson Angelo.....	Virginia	Albert Sidney Davidson...	Dist. of Columbia
William Harry Barnhard..	Ohio	Max S. Goldberg.....	Dist. of Columbia
Ewing Marvin Wood Bear..	Dist. of Columbia	Charles Rufus Irby.....	Virginia
Claude Quayle Cannon....	Utah		

UNIVERSITY OF MICHIGAN, DENTAL DEPARTMENT.

THE annual commencement exercises of the University of Michigan, College of Dental Surgery, were held in Ann Arbor, Mich., Thursday, June 24, 1909.

The commencement oration was delivered by Chas. Mills Gayley, Litt.D., LL.D.

The degree of Doctor of Dental Surgery was conferred on the following graduates:

Reginald Thomas Atkinson	Charles Daniel Freeman	George Irving Perry
Laban Groves Bailey	Robert Cleveland Hall	Abraham Prodromou Pilides
David Winfield Barr	Robert Bates Howlett	Walter Lee Reesman
Jesse Holden Beckwith	Sigmond Janczura	Erwin Lyman Richardson
John Wesley Brown	Francis Chrysostom Jones	Glenn D. Rowe
Martin Richard Clinton	Francis Robert Kelly	William John Seitz
Cecil Hickman Collins	John Joseph Lenney	Fred Lawson Shepard
Harold Madison Coss	Howard Charles Lockwood	Raymond George Sigler
Walter Savage Cross	Emmett Ara Lowery	George Harry Smith
Martin Louis DeBats, Jr.	Donald George Macdonald	William David Strobel
George Arthur Deer	Guy Thomas McNamara	Charles Joseph Sugnet
Ralph Hiram Dimock	Ernest Eugene Masters	Orville Nicholas Treweek
LeRoy Walter Doxtater	Anne Meinert	Arthur Warren Waite
Homer Benton Dunning	Barstow Bryant Moss	Dale Humphrey Watson
James Ralph Foreman	John Franklin Munro	Harold Beach Wheeler
Stella Pearle DeWitt Foster	Willis Ingomar Nash	Arthur Zetterstedt
Charles Sackrider Fowler	Glenn Campbell Orser	

HARVARD UNIVERSITY, DENTAL DEPARTMENT.

THE annual commencement exercises of the Dental Department of Harvard University were held in Cambridge, Mass., June 30, 1909.

The degree of Doctor of Dental Medicine was conferred on the following graduates:

Isaac Charles Arkin	James Edward Gibbons	Raymond James Murphy
Clarence Fielding Churchill	Henry Dwight Howard	Philip Wilkins Stone
Lemuel Morgan Davis	Isadore Hyan Lazarus	Frederick Jeremiah Sullivan
William Francis Drea		

UNIVERSITY OF MINNESOTA, COLLEGE OF DENTISTRY.

THE annual commencement exercises of the University of Minnesota, College of Dentistry, were held June 10, 1909, in the Armory, Minneapolis, Minn.

An address was delivered by Professor Maria L. Sanford.

The degree of Doctor of Dental Surgery was conferred by President Cyrus Northrop, LL.D., on the following graduates:

Frederick Charles Bakke	Minnesota	Abraham Severin Michalson ..	Wisconsin
Clarence M. Basford	Minnesota	Frank A. Mittelstaedt	South Dakota
Clement K. Bird	Minnesota	William Henry Moos	Minnesota
Harry Adam Britzius	Minnesota	George Allen Nesse	Minnesota
John Francis Cahill	Minnesota	Emil Nels Nordin	Minnesota
Harry T. Capron	Minnesota	James William O'Neil	Minnesota
Edgar Chapman	Minnesota	Alfred A. Pagenkopf	Minnesota
Cecil Walters Coad	Minnesota	Frank J. Phillips	Minnesota
Melville Rankin Coulter	Minnesota	Irving Lester Porter	Minnesota
Oscar DeForest Davis	Minnesota	Louis C. Quast	Minnesota
Raymond Bristol Donald	Minnesota	Henry Dane Rand	Ohio
John Raphael Doris	Minnesota	Fay Washington Rayman	Minnesota
Max E. P. Ernst	Minnesota	Arthur Mellette Ruggles	Minnesota
Richard Elmer Gustafson	Minnesota	Earl Salisbury	Minnesota
Joseph W. Janecky	Minnesota	Adolph R. Schmid	Minnesota
Frederick John Kaiser	North Dakota	Charles R. Schwartz	Minnesota
John Benjamin Kohagen	Minnesota	Marguerite Sawyer Scribner ..	Minnesota
Arnold John Larsen	Minnesota	Paul Oscar Solem	Minnesota
Edward Lawrence	Minnesota	Arthur E. Swanson	Minnesota
William Floyd Linder	Minnesota	Carl Augustus Thulien	Minnesota
Dunbar Francis Lippitt	Minnesota	Paul Conrad Verne	Minnesota
William Theodore Lund	Minnesota	Arthur William Walker	Minnesota
Charles Atkinson McFadden ..	Minnesota	Charles Wiethoff	Minnesota
Archibald McPhail	Minnesota	Edgar Osiander Wilson	Minnesota
George Robert Metcalf	Minnesota	Seward Randall Winter	Minnesota

SOCIETY NOTES AND ANNOUNCEMENTS.

DENTAL INDEX BUREAU

UNDER THE AUSPICES OF THE

NATIONAL ASSOCIATION OF DENTAL PEDAGOGICS.

THE following matter has been issued in the form of a circular justly purporting to be "of especial interest to students, writers, publishers, editors, librarians, colleges, dental societies, etc." It is described as—

A PLAN BY WHICH SUBSCRIBERS WILL BE FURNISHED A CLASSIFIED CARD INDEX OF ARTICLES IN THE LEADING DENTAL JOURNALS.

At a meeting of the National Institute of Dental Pedagogics, held in St. Louis last December, a committee was appointed to establish a Dental Index Bureau. Briefly stated, it

is intended that this committee shall employ a competent person to review and classify all of the articles in ten or twelve of our leading dental journals, and shall furnish to each of the subscribers to the Bureau, at frequent intervals, cards so classified and grouped that the subscriber may easily and quickly find all the articles on any subject in dentistry. These cards will be made on a definite system, by which additional cards may be added as they are received and always go to their proper places; so that no matter how many additions may be made from year to year, all of the cards on each subject will be in a separate group. For example, all of the articles on the subject of filling teeth with gold will be in one group, all on filling teeth with amalgam in another, all on cavity preparation in another, all on alveolar abscess in another, etc.

It is hardly necessary to mention the value of such an index to the wide-awake members of the profession. Journals which may have accumulated, and which are now almost worthless on account of the difficulty in finding articles when desired, will become of service as the index is extended to cover them. The man who has occasion to look up a particular subject, or to write a paper, can find all that has been written on that subject instantly. The grouping of articles on each subject enables one to bring together the views of many writers. Post-graduate courses of study can be instituted by dental societies or undertaken by individuals; the ready reference index will make college libraries of the greatest value to the faculty and to the student body; editors and writers will find their work facilitated, and the results of their study more gratifying to themselves and more highly appreciated by their readers.

The idea of the committee is to organize a permanent society for the purpose of classifying and indexing all dental literature. The present plan is but preliminary to the greater work, which will cost less and less to individual subscribers as the number of members is increased. Those who help to start the work will profit more than those who follow, and will have the satisfaction of participating in one of the greatest advance movements in dentistry.

The subject-matter of several of the leading dental journals has already been classified and indexed by Dr. Arthur D. Black, at a great expenditure of time and money. This index contains about 40,000 cards, cataloging articles in various journals from 1839 to date; but it is not available, for obvious reasons, to the profession at large. Your committee is privileged to copy these cards, should the funds subscribed permit, which would be of great benefit to the subscribers and incidentally to the whole profession.

It is the committee's intention to this year furnish each subscriber with author and subject cards for all original articles, papers read before societies, book reviews, and editorials, in about ten journals for 1908 and 1909—from 4000 to 5000 cards, all properly arranged with all cards for each subject together, with guide cards for each subject and with author cards arranged alphabetically. It is expected that in 1910 the cards will be furnished for the same journals for the years 1907 and 1910; and in 1911 cards for 1906 and 1911. Thus in three years each subscriber will receive cards for these journals for six years—probably 25,000 to 30,000 cards. These cards will be sent in boxes in which they may be kept permanently. The number of journals indexed and the number of cards

sent out by the committee, however, will depend upon the number of subscribers.

The preliminary report of this committee, which was made at the St. Louis meeting, gives an outline of the plan. It will be noticed that it is the intention to try this plan for a period of three years, and subscriptions at the rate of Twenty-five Dollars (\$25.00) a year for that period may be sent to any member of the committee.

Subscriptions will be received from individuals, dental journals, dental schools, or dental societies. Any person or group of persons may send in a single subscription, and one set of cards will be sent in return. Subscription blanks may be had from any member of the committee.

Committee for 1909—Dr. W. L. Fickes, *Chairman*, 6200 Penn ave., Pittsburg, Pa.; Dr. Arthur D. Black, 31 Washington st., Chicago, Ill.; Dr. Herman Prinz, 603 Century Bldg., St. Louis, Mo.

REPORT of the Committee on Classifying and Indexing Dental Literature, to the Institute of Dental Pedagogics, at the annual meeting, St. Louis, 1908-09.

The undersigned committee, appointed by the Institute of Dental Pedagogics for the purpose of devising ways and means of classifying and indexing current dental literature, as an evidence of progress presents to the members of the Institute and others interested the following plan:

1. That the subscribers to this plan organize themselves into an association to be known as The Dental Index Bureau.

2. That the above-mentioned committee, appointed by the Institute, will devise ways and means for carrying out the work of the Bureau during the coming year, and will call a meeting at the time and place of the next meeting of the Institute, for the perfecting of a permanent organization.

3. That this committee will employ a competent person to classify as much of the current dental literature as possible, beginning with January 1909 journals, and will furnish subscribers, at frequent intervals, with author and subject cards of all articles classified.

4. That this committee will be guided by a vote of the subscribers in the selection of the literature to be classified.

5. If the funds subscribed will permit, as much as possible of the literature of previous years will be similarly classified and indexed.

W. L. FICKES, *Chairman*,
ARTHUR D. BLACK,
HERMAN PRINZ.

ARMY DENTAL CORPS.

MEMORANDUM of changes of stations of dental surgeons, U. S. army, for the month ending August 14, 1909:

E. P. Tignor: Granted leave of absence for one month.

R. H. Mills: Ordered to Fort Slocum, N. Y., for temporary duty.

Alden Carpenter: Granted leave of absence for twenty-five days.

W. H. Ware: Ordered to Vancouver Barracks, Wash., for duty, at the expiration of his present leave of absence.

S. D. Boak: Relieved from duty at Vancouver Barracks, Wash., and ordered to Fort McDowell, Cal., for duty.

C. E. Lauderdale: Ordered to visit in succession, for temporary duty, Fort Huachuca, Ariz.; Whipple Barracks, Ariz.; Fort Apache, Ariz.; and Fort Wingate, N. M., returning then to Fort Logan, Colo.

G. H. Casaday: Ordered from Fort Shafter, H. T., to the Presidio of Monterey, Cal., for temporary duty.

G. I. Gunkel: Ordered to Fort Oglethorpe, Ga., for one month.

EXAMINATIONS OF DENTISTS FOR THE ARMY.

THE Surgeon-general of the army announces that while there are no vacancies in the dental corps, he intends to hold examinations to establish an eligible list from which appointments will be made as vacancies occur. Applicants for appointment as dental surgeons in the United States army will be authorized to present themselves at the nearest military post at which a commissioned officer of the medical corps is stationed, for examination as to physical qualifications for employment, and those found physically qualified will be invited to report at West Point, N. Y., or San Francisco, California, about August 1909, for the professional examination. No allowance can be made for expenses incurred in undergoing these examinations.

Application blanks can be procured upon application to the Surgeon-general of the army. The essential requirements to securing an invitation are that the applicant shall be between twenty-four and thirty years of age, a graduate of a standard dental college, and shall be of good moral character and habits.

Army dentists are employed under a three years' contract at the rate of \$150 per month; are entitled to traveling allowances and suitable quarters; they have the privilege of purchase of supplies at the army commissary. The hours of official duty are from 9 A.M. to 4 P.M., although they are subject to emergency calls. During other hours they are permitted to treat persons not entitled to gratuitous services with their own materials.

MARYLAND STATE DENTAL ASSOCIATION

AND THE

DISTRICT OF COLUMBIA DENTAL SOCIETY.

A JOINT meeting of the Maryland State Dental Association and the District of Columbia Dental Society will be held in Washington, D. C., October 28 to 30, 1909.

For further information address either of the following:

F. F. DREW,

701 Howard st., Baltimore, Md.

A. D. WEAKLEY,

Washington, D. C.

AMERICAN SOCIETY OF ORTHODONTISTS.

THE ninth annual meeting of the American Society of Orthodontists will be held in Cleveland, Ohio, on Monday, Tuesday, and Wednesday, October 4, 5, and 6, 1909.

FREDERICK C. KEMPLE, *Sec'y*,

43 W. 48th st., New York city.

ODONTOGRAPHIC SOCIETY OF WEST PHILADELPHIA.

THE next meeting of the Odontographic Society of West Philadelphia will be held Monday evening, October 4, 1909, at 8 P.M., in the Amphitheater of Dental Hall, University of Pennsylvania.

No meetings were held during July, August, and September; this one, being the opening of our fall and winter sessions, will be of unusual interest to all members.

R. R. PARKS, *Sec'y*.

NORTHEASTERN DENTAL ASSOCIATION.

THE fifteenth annual meeting of the Northeastern Dental Association will be held in the Churchill House, Angell st., Providence, R. I., on October 7, 8, and 9, 1909. The officers and committee intend this to be a very interesting and instructive meeting.

E. O. KINSMAN, *Sec'y*,
Cambridge, Mass.

Tousey, Boston, assistant secretary; Joseph T. Paul, Boston, treasurer; C. Edson Abbott, Franklin, editor.

Dental Journal: *Journal of the Allied Societies*. Massachusetts editor, C. Edson Abbott, D.D.S., Franklin, Mass.

Place of meeting in June, 1910: Springfield, Mass.

C. EDSON ABBOTT, *Editor*.

SOCIEDAD DENTAL MEXICANA.

At the special session of the Sociedad Dental Mexicana held on July 7, 1909, the following officers were elected to serve for the year 1909-10: Ricardo Figueroa, president; Alfredo Reguera, vice-president; Ernesto Paz, recording secretary; Francisco Pastor Artijas, corresponding secretary; Teófilo Valdez, treasurer.

ERNESTO PAZ, *Sec'y*.

NEW YORK ODONTOLOGICAL SOCIETY.

At the annual meeting of the New York Odontological Society, held April 20, 1909, the following officers were elected for 1909-10: W. D. Tracy, president; W. B. Dills, vice-president; W. B. Dunning, recording secretary; J. G. Fulton, corresponding secretary; F. C. Walker, treasurer; W. W. Walker, curator, and F. C. Kemple, editor. Executive Committee—B. C. Nash, chairman, S. G. Perry, and A. L. Swift. Clinic Committee—J. W. Taylor, chairman, H. W. Gillett, and C. F. Ash.

F. C. KEMPLE, *Editor*.

MASSACHUSETTS DENTAL SOCIETY.

At the forty-fifth annual meeting of the Massachusetts Dental Society, held in Boston, Mass., June 9 to 11, 1909, the following officers were elected for 1909-10: Cornelius S. Hurlbut, Springfield, president; Eugene H. Smith, Boston, first vice-president; Carl Lindstrom, Boston, second vice-president; C. W. Rodgers, Dorchester, secretary; Coleman

VERMONT STATE DENTAL SOCIETY.

At the thirty-third annual meeting of the Vermont State Dental Society, held jointly with the New Hampshire State Dental Society, at The Wiers, N. H., the following officers were elected for the ensuing year: C. F. Meacham, president; A. Z. Cutler, first vice-president; L. E. Mellen, second vice-president; Harry F. Hamilton, secretary; W. H. Munsell, treasurer. Executive Committee—F. H. Brown, Dana E. Dearing, and Thomas Mound.

HARRY F. HAMILTON, *Sec'y*.

HARVARD DENTAL ALUMNI ASSOCIATION.

THE following officers were elected for the ensuing year at the thirty-eighth annual meeting of the Harvard Dental Alumni Association, held in Boston, Mass., June 28, 1909: Henry A. Kelley, Portland, Me., president; Waldo E. Boardman, Boston, Mass., secretary; Harold DeW. Cross, Boston, Mass., treasurer. Executive Committee—Waldo E. Boardman, chairman *ex officio*, Boston; Charles E. Parkhurst (term expires 1910), Somerville, and Arthur H. Stoddard (term expires 1911), Boston. (The above-named officers constitute the Council.) Trustees of Life-Membership Fund—Harold DeW. Cross, treasurer *ex officio*, Boston; Frank T. Taylor (term expires 1911), Boston, and Charles P. Briggs (term expires 1912), Boston. Committee on Nomination and Election of Officers—Amos I. Hadley, Boston; Eugene B. Wyman, Cambridge, and Robert T. Moffatt, Boston.

WALDO E. BOARDMAN, *Sec'y*.

ILLINOIS BOARD OF EXAMINERS.

THE annual meeting of the Illinois State Board of Dental Examiners for the examination of applicants for a license to practice dentistry in the state of Illinois will be held in Chicago at the Dental Department of the University of Illinois, corner Honore and Harrison sts., beginning Monday, November 8, 1909, at 9 A.M.

The following preliminary qualifications shall be required of candidates to entitle them to examination by this board for a license to practice dentistry in the state of Illinois. Graduates of a reputable dental or medical school or college, or dental department of a reputable university, who enter the school or college as freshmen on or after the school year of 1906-07, must have a minimum preliminary education of not less than graduation from an accredited high school or a certificate from the state superintendent of public instruction, equivalent officer or deputy, acting within his proper or legal jurisdiction, showing that the applicant had an education equal to that obtained in an accredited high school; which certificate shall be accepted in lieu of a high school diploma.

Graduates will be furnished with proper blanks and such other information as is necessary on application to the secretary. All applications must be filed with the secretary five days prior to date of examination. The examination fee is twenty dollars, with an additional fee of five dollars for a license.

Address all communications to

T. A. BROADBENT, *Sec'y*,
705 Venetian Bldg., Chicago, Ill.

OHIO STATE DENTAL BOARD.

THE Ohio State Dental Board will hold its regular fall meeting in Columbus, on October 19 to 22, 1909, for the examination of applicants for license. All applications should be in the hands of the secretary not later than October 9th.

For further information and blank applications address

F. R. CHAPMAN, *Sec'y*,
305 Schults Bldg.,
Columbus, Ohio.

ARKANSAS BOARD OF EXAMINERS.

THE next meeting of the Arkansas Board of Dental Examiners will be held November 29 and 30, 1909, in Little Rock.

All applicants are required to pass an examination in order to obtain a certificate to practice in this state. No temporary permits. Examination fee, \$15.00.

A. T. McMILLIN, *Sec'y*,
111 E. 5th st., Little Rock, Ark.

NEW HAMPSHIRE BOARD OF REGISTRATION.

THE next meeting of the New Hampshire Board of Registration in Dentistry, for examination, will be held at Masonic Banquet Hall, Manchester, N. H., December 7, 8, and 9, 1909.

No special examinations. All persons must become registered before beginning practice.

A. J. SAWYER, *Sec'y*,
Manchester, N. H.

UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING JULY 1909.

July 6.

No. 926,977, to JOHAN BRUN. Dental instrument tray.

No. 927,406, to W. R. GWIN. Multiple die plate.

No. 927,420, to R. P. LYLE. Automatic dental hammer.

No. 927,850, to JULIAN GARTRELL. Cotton-roll holder.

THE DENTAL COSMOS.

Vol. LI.

OCTOBER 1909.

No. 10.

ORIGINAL COMMUNICATIONS.

A CASE OF LUDWIG'S ANGINA FOLLOWED BY DEATH.

By Dr. LUIGI ARNONE, Florence, Italy.

AT the request of Professor Picchi, assistant in the pathological anatomy department of the University of Florence, I went to the anatomical rooms to examine post-mortem a case which proved deeply interesting. It was a corpse which had been sent from the throat, nose, and ear department, under Professor Toti.

The history is briefly as follows:

Angelo Sforzi, from Calenzano, a peasant, age twenty-five, suffered from toothache accompanied by fever. Four days before his admittance to the hospital there appeared a swelling along the lower jaw on the left side, with diffusion to the cheek and neck on the same side. Temperature 38.8 C. Pulse 130. Sub-delirious state. Death supervened on the seventh day. Autopsy was made on the eighth, at 10 o'clock.

Necroscopy. The osseous system is regular, the body well nourished. Four surgical wounds appear in the median and left side of the neck. Around the cuts the subcutaneous cellular tissue and the muscles are infiltrated with dark fetid pus, and appear to be necrotic. The lower mediastinum is also infiltrated by ichorous, fetid substances, and

in the region anterior to the heart reaches the thickness of one centimeter. The pericardium is thickened both parietally and viscerally, and at some points is covered with fibrinous stratifications. On its posterior aspect the heart shows hemorrhagic spots. The right lung has the lower lobe hepatized on the lower side, of dark red color, presenting on its pleural surface some slight fibrinous stratifications. In the left lung there is slight hypostasis. The heart is normal, the liver enlarged, and of nutmeg color; the spleen is enlarged, the capsule opaque, the pulp reddened. There is no appearance of increased connective tissue. The kidneys are enlarged, the capsule is easily detached, the cortical substance is thickened and of turbid, blackish appearance, with marked arterial injection.

In the lower jaw one notices that the left third molar is lying horizontally and that under the tooth there is a large pocket filled with ichorous contents, with thick fibrous walls around it, communicating with the alveolus.

The tooth (as can be seen in Fig. 1) is apparently sound, with the pulp in a state of putrefaction.

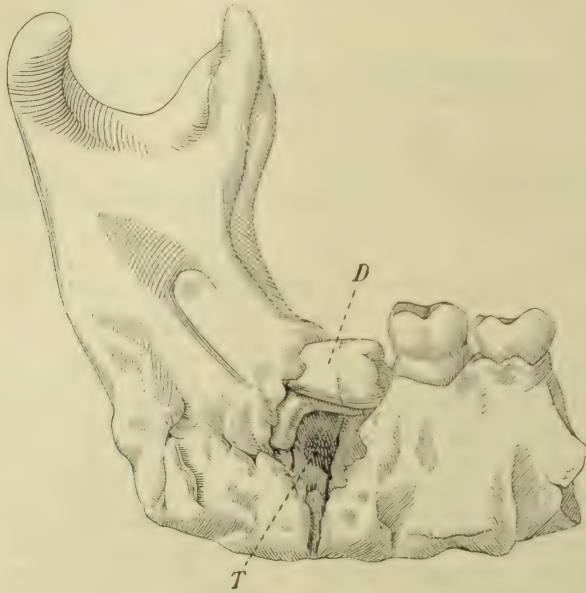
One may thus easily reconstruct the process of infection and follow the path

of diffusion: Food lodging between the lower left second and third molars must have undergone maceration, with subsequent formation of acids and detachment of the gum from the periosteum; hence periodontitis, periostitis, and formation of an ichorous pouch, the opening of the pouch into the fascia lata of the neck, phlegmonous complications, and propagation to the mediastinum through the lymphatic system in the neck; after this

authors have recourse to lesions of the gum, are always, or nearly always, of paradental origin.

In fact, in Professor Toti's department within the last two years we have had several cases of Ludwig's angina with sound teeth, or at least teeth without decay, notwithstanding which, infection has penetrated by the peridental membrane, or, to be more exact, along the root of a tooth. One case occurred last September

FIG. 1.



D, Third molar lying horizontally. T, Ichorous pouch of fibrous connective tissue.

mediastinitis, general infection, septicæmia, and death.

Thus we are brought face to face with a case of "Ludwig's angina" without tooth-decay.

Up to the present all cases of Ludwig's angina of dental origin which have been described had their beginning, or we should rather say their "etiological momentum," in a decayed tooth. The case in point, however, which we may describe as of paradental origin, recalls our attention to the modes of penetration of infection; and we feel convinced that all of those undefined forms of Ludwig's angina in the explanation of which many

in a patient whom I was hoping to present before the Congress of the Federation of Medico-Dentists here in Florence, but was prevented from doing so by hospital bureaucracy.

Returning to our case, I shall confine myself to a short description, leaving a more ample account to the time when I shall have examined a greater number of similar cases.

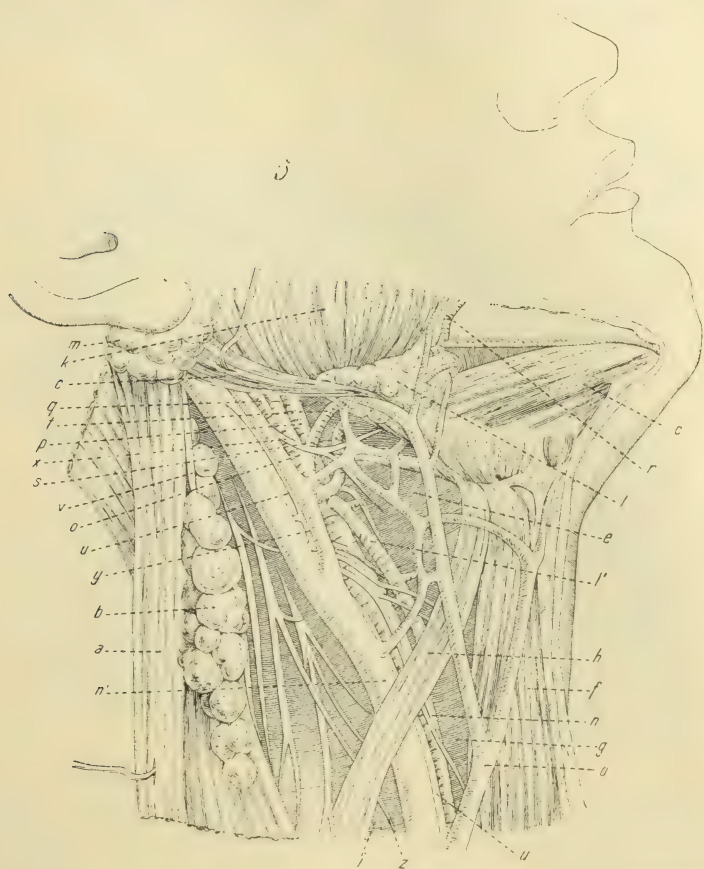
The cause of death was certainly acute mediastinitis. In fact, in the last days the patient had high fever and delirium. These phenomena, however, found a predisposed field. The liver being nutmeg-colored, the hepatic venous stasis or com-

pression of the large and small blood-vessels must have commenced two or three weeks before, so that we have to admit a hematogenous infection since the

cause this hematogenous infection resulted in acute nephritis.

We may therefore safely affirm that, taking into consideration these anatomo-

FIG. 2.



—Bergmann.

a, Sterno-cleido-mastoid. *b*, Lymphatic glands. *c*, Anterior belly of digastric. *c'*, Posterior belly of digastric. *e*, Thyroideus muscle. *f*, Sterno-hyoid muscle. *g*, Sterno-thyroid muscle. *h*, Omohyoid. *i*, Anterior scalenus. *k*, Masseter. *l*, Submaxillary gland. *l'*, Inferior thyroid artery. *m*, Parotid gland. *n*, Common carotid. *o*, External carotid. *p*, Internal carotid. *q*, Commencement of occipital artery. *r*, External maxillary artery. *r'*, Same in front of masseter. *s*, Lingual artery. *t*, Superior thyroid artery. *n'*, Jugular vein. *o'*, External jugular vein. *u*, Vagus nerve. *v*, Cervical nerve. *x*, Hypoglossus. *y*, Anastomosis between hypoglossus and cervical plexus. *z*, Phrenic nerve crossing anterior scalenus muscle.

beginning of the formation of the ichorous pouch.

While the liver was losing its power of filtration, the kidneys were beginning to suffer, either from excess of work or be-

pathological alterations, the organism was already robbed of its defenses against lymphatic infection, and thus in the last stage, when the lymphatics of the neck led the infection into the mediastinum,

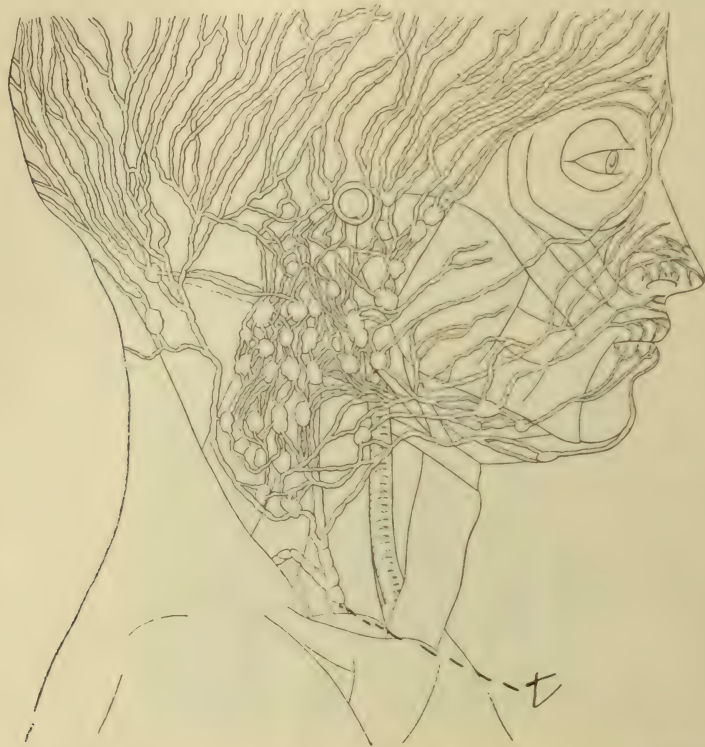
acute mediastinitis broke out like an explosion, and with such violence as to occasion death.

As I wish to avoid long anatomical descriptions of the region affected, I have thought it advisable to present some illustrations, which I believe will demonstrate more clearly what is meant, placing

the digastric, stylo-hyoideus, mylo-hyoideus and hyoglossus.

The gland occupies a good part of the central fossa (see Fig. 2), and is surrounded posteriorly by the branch of the artery which starting from the external carotid, is directed upward, then forward, taking the name of facial, and which con-

FIG. 3.



t, Lymphatic trunk.

—Romiti.

under the eye the organs involved in Ludwig's angina.

The part most concerned in Ludwig's angina is the supra-hyoid fossa, sometimes the lateral, sometimes the median, limited therefore by the lower margin of the jaw, the digastric, the hyoid bone, and the base of the tongue. (See Fig. 2.)

Proceeding from the outside inward, we find the skin, the platysma myoides, the fascia lata, the submaxillary glands with their satellite lymphatic ganglia;

stitutes a sort of S in the region of the gland.

The facial artery lies under the facial vein, which follows almost the same course.

The nerves in this region include, besides the greater hypoglossus, the lingual nerve with the submaxillary ganglion annexed. The greater hypoglossus and the lingual nerve form at this point an anastomotic plexus. The glosso-pharyngeal nerve remains above and back.

What individuals are especially predis-

posed to Ludwig's angina, and at what age? Some authors, led by Murchison, have noticed that this disease attacks weak or scrofulous people. This is true in the greater number of cases, but this year, in the hospital of Santa Maria Nuova here in Florence, we have had two cases in healthy and strong individuals—one sixty-two years of age and the other

some authors have affirmed that not even childhood is immune from this disease. Usually the period coincides with the eruption of the third molars, which often is the cause of lacerations, biting of the cheeks, traumatic complications, and suppurations in the parts. Forty per cent. of those who cut the lower third molars suffer when these erupt.*

FIG. 4.



Longitudinal section of ichorous pouch. *a*, Epithelium of the mouth. *b*, Relaxed connective tissue layer. *c*, Zone of pericapsular connective tissue. *d*, Inflammatory infiltrations (polynucleated). *e*, Deep-seated infiltrations, with sloughing produced by abscess. *f*, Salivary gland of normal aspect. *f*¹, Excretory duct of salivary gland. *g*, Sheath of connective tissue around the gland.

forty-four. Both suffered from paradental angina, which began by slight pain in the lower incisor regions, with sponginess of the gums. The teeth were sound, or at least were not decayed.

According to statistics upon Ludwig's angina, it is easy to gather that two-thirds of the sufferers were between twenty and thirty years of age.* No typical cases have been recorded in subjects under twenty years of age, though

The commencement of angina is not marked by constant symptoms. The dental indication is sometimes lacking. The patient is attacked by chills and fever after a state of depression or a feeling of malaise which may last for a day or two. It is not long before rigidity of the muscles and swelling manifest themselves, and with these symptoms there are complications from compression which render deglutition difficult and respiration hard.

* Roser describes twenty cases amongst soldiers.

* See *Là Stomatologia*, November 1905.

The swelling has a woody hardness and feeling. The patient inclines his head toward the diseased part, avoids any movement, keeps the eyes wide open, and has a general appearance of depression and fatigue.

The mouth is dry, with acrid emanations, hot and inflamed; the teeth are coated. After five or six days the swelling extends and is surrounded by edema; the phenomena of compression become more marked, respiration may become sibilant or stertorous, deglutition greatly impeded or rendered impossible; thick, ropy saliva flows from the mouth; the face is deformed, the skin red and swollen.

If tumefaction is lateral, it spreads backward toward the parotid gland, and downward, involving all the muscles of the neck. The tongue is pushed upward, and is fixed and protruding.

Very soon the general symptoms supervene: High fever, delirium, pyemia, death.

The anatomico-pathological lesions that one finds on the bodies post-mortem are nearly always the same: Gangrene of the muscles of the neck, septicemia, and phenomena of pyemia having relation to the form and duration of the disease.

The submaxillary glands may be slightly inflamed, being surrounded by inflamed tissues, but in the case in question (see Fig. 4) it is evident that the capsular sheath of these glands has not been penetrated by the process of infiltration, although all the time necessary for infiltration to have manifested itself has elapsed. Can we not, then, draw the inference from this case that the lymphatics and lymph glands in this region offer a safety barrier during alveolo-dental abscess, and in many conditions occurring as the consequence of neglected tooth-decay?

The etiology of Ludwig's angina presents many obscure points. Oft-repeated bacteriological researches by many authors have established the presence of the usual vegetal elements common to suppurative processes—diplococci, streptococci, staphylococci—so that, speaking

from the strictly bacteriological point of view, we are in the presence simply of a phlegmonous process over a region which is extremely rich in bloodvessels and nerves. Clinical observation, however, tells us that it cannot be explained how a phlegmonous process, even in a part well supplied with bloodvessels and nerves, can produce within forty-eight hours the death of a strong individual who three days before was enjoying good health.

Professor Toti makes the supposition that there may be some saprophytic vegetation at work which has escaped the means of research which we possess today.

Prognosis in cases of angina is always reserved. Some cases set in with mild symptoms, suddenly developing into a serious form and ending even in death. Others, again, commence with alarming symptoms and resolve themselves favorably in a short time.

Treatment may be first medical, then surgical. At the beginning one may prescribe applications of ice to the part, and bloodletting; later on, incisions may be resorted to in order to establish a perfect drainage, so that pus may be removed from the tissues as soon as it is formed.

The dentist may help greatly at the commencement when the trouble is of dental or paradental origin. When the process is well advanced, however, it is prudent to abstain from operations. In the case illustrated, the specialist might easily have arrested the trouble at its inception and saved the life of a man of twenty-four. The position of the tooth would have entailed a special technique and perhaps even general anesthesia, but the result would have been certain. This being the case, medical jurisprudence, always on the lookout for one responsible, would have established in our case a social crime!

Some medical man or other must surely have visited the victim, but, finding that the tooth was sound and no inflammation was present, probably classified the pain as one of the many neuralgias which the followers of *Æsculapius* call to their aid when they do not wish to say, like Charcot, "*Je ne comprends pas.*" When the

swelling came on, the doctor packed the patient off to the hospital, but it was too late.

Medical men may justly say that during their six years of university training [in Italy] they have only once heard the teeth spoken of—and that by the professor of anatomy. The responsibility thus falls back on society itself for not organizing the studies in such a way as to equip medical men with the knowledge necessary for a proper understanding of a case in which life is jeopardized, and in which a slight surgical operation performed in time may save it.

If, in the case in question, the operation had been performed later on, it could not have had any beneficial result for the patient, who would have died just the same; and the operator would have brought odium upon his head from the

relatives of the deceased, who always wrongly attribute the responsibility in the case of an operation.

The case under Professor Massei of Naples,* reported by Trifiletti, is most instructive for us. The relatives never forgave the dentist for having made a few simple dressings in a tooth fifteen days before the patient died. The post-mortem revealed the fact that the patient had succumbed to Ludwig's angina with localizations on the lungs and pleura, which Massei puts down to actinomycosis.

Note.—I have been enabled to make these observations on Ludwig's angina owing to the courtesy and hospitality shown me in the nose, throat, and ear department, under the direction of Professor Toti and his assistants, Dr. Orlandini and Dr. Torrigiani, to all of whom I desire to express my gratitude.

HARD TEETH AND SOFT TEETH.

By EUGENE S. TALBOT, Chicago.

(Read before the Dental Society of the State of New York, at its annual meeting, Albany, May 6, 1909.)

DR. G. V. BLACK, some years ago, published an article entitled "An Investigation of the Physical Characters of the Human Teeth in Relation to Their Diseases, and to Practical Dental Operations, together with the Physical Characters of Filling Materials."* His researches in this report were extensive, painstaking, and exhaustive. The conclusions arrived at are—

The teeth are strongest in youth and early adult age, diminishing somewhat in strength with advancing age.

Teeth that have lost their pulps and have become discolored lose strength in a marked degree, apparently from deterioration of the organic matrix.

Teeth that have become badly worn from mastication and in which the pulps become so much calcified as to cut off the nutrition of the crown portions of the dentin, lose strength, apparently from deterioration of the organic matrix.

Teeth of old people, and especially those in which much calcification of the pulps occurs, deteriorate in strength.

There is no basis for the supposition that the teeth of children under the age of twelve years are *too soft* to receive metallic fillings.

Differences in density or in percentage of lime salts in the teeth are not the controlling factors in the strength of the teeth nor their hardness, this seeming to depend upon the condition of the organic matrix.

Differences in strength of the teeth have

* Cantani e Maragliano: "Angina di Ludwig," p. 90.

* DENTAL COSMOS, May 1895.

no influence as to their liability to caries. Differences in the density or in the percentage of lime salts have no influence as to their liability to caries.

The active cause of caries is a thing apart from the teeth themselves, acting upon them from without, and from a consideration of the facts thus far developed the logical inference is that the cause of the differences in the liability of individuals to caries of the teeth is something in the constitution, operating through the oral fluids and acting upon the active cause of caries, hindering or intensifying its effects.

Caries of teeth is not dependent upon any condition of the tissues of the teeth, but upon conditions of their environment.

Imperfections of the teeth, such as pits, fissures, rough or uneven surfaces, and bad forms of interproximate contact, are causes of caries only in the sense of giving opportunity for the action of the causes that induce caries.

The objects that are to be attained in filling teeth are the perfect exclusion of the causes of caries from the tissues by sealing the cavity, and securing such form as will prevent lodgments of debris about the margins of the filling, and thus preventing the further action of the cause of caries.

There is no basis for the supposition that some teeth are too soft or too poorly calcified to bear filling with gold or other metal in use for that purpose, since all are found to be abundantly strong.

There is no basis for the selection and adaptation of filling materials to soft teeth, hard teeth, frail teeth (in structure), or poorly calcified teeth. What basis there may be in the conditions surrounding the teeth for the selection and adaptation of filling materials must be left to future developments to discover.

With our present knowledge, the only basis for the selection and adaptation of filling materials to classes of cases is the individual operator's judgment as to which he can so manipulate as to make the most perfect filling, considering the circumstances, his own skill, and the durability of materials.

There is no basis for the supposition that calcic inflammation of the peridental membrane or phagedenic pericementitis (so-called pyorrhea) attacks persons who have dense teeth in preference to those whose teeth are less dense.

There is no basis for the treatment of pregnant women medicinally with the view of furnishing lime salts to prevent the softening of their teeth or with the view of producing better calcified teeth in their offspring.

Dr. Kirk, in his able article, "The Structural Characteristics of the Calcified Dental Tissues as Related to the Questions of So-called 'Hard' and 'Soft' Teeth,"* says: "I am fully convinced that the principal deductions made by Dr. Black from his extensive experimental study of the physical characteristics of the teeth are sound and trustworthy."

Viewing the summary from a strictly dental standpoint, there is no doubt that both Dr. Black and Dr. Kirk are partly correct. That there is a difference in tooth structure all will admit. I cite as an illustration the case of a strong, healthy young man of Irish parentage, twenty-one years of age, who has been under my care for some years. He is of more than ordinary intelligence, perfectly healthy, and of an athletic build. His jaws measure two and one-half inches from the buccal surfaces of the first molars. He had thirty-two good, sound, hard teeth without a cavity. He contracted lues. In two years his teeth softened, with rapid decay, erosion, abrasion, discoloration, and interstitial gingivitis. At the end of six years the disease has been arrested, as well as the interstitial gingivitis, but the teeth still remain soft and the usual history of decay is progressing. This is a typical and not uncommon case of hard teeth made soft by disease. It is a well-known fact that many people of fifty years of age who never use a tooth-brush or mouth-wash have thirty-two good, hard, sound teeth without decay.

We have, then, the two extremes, hard teeth and soft teeth. Let us discuss Dr. Black's conclusions from a biologic instead of a dental viewpoint, to see if we cannot obtain a different solution of the problem.

To review Dr. Black's conclusions, a ray of light is found in the first four—all that is necessary for our purpose.

Dr. Black admits that the teeth diminish in strength with advancing age; that when pulps are lost the teeth discolor and lose strength in a marked degree, apparently from deterioration of the organic

* DENTAL COSMOS, May 1903.

matrix; that when the pulps have become so much calcified as to cut off nutrition, the crown portions of the dentin lose strength, apparently from deterioration of the organic matrix; that the teeth of old people, and especially those in which much calcification of the pulps occurs, deteriorate in strength.

I propose to show that all these conditions are brought about by systemic changes. Before taking up this part of the subject, however, let us first discuss hard teeth. An examination of the teeth in skulls of the most ancient races shows a vast difference in structure and shape from those of today. Ancient skull teeth have, as a rule, short bell crowns, plenty of space in the alveolar process between the roots, are deeply set in the jaws, having flaring short roots, with thick alveolar processes; they are strong and fine-grained (these are points considered by scientists in determining the evolution of animals); they are nearly always thirty-two in number; the jaws measure two and one-quarter to two and one-half inches in diameter, differing with the nationality and environment. The teeth are rarely decayed, and when decay is observed it is usually a dark line only, in the sulci of the crowns, scarcely ever at the approximal surfaces. The teeth and jaws are better developed, owing to the greater use to which the ancient races put them.

Dr. G. Elliot Smith* (Cairo, Egypt) says, in the London *Lancet*, in regard to decay of the teeth of the Egyptians 5000 years ago: "Dental caries was rare among the people of lower social status, and almost unknown in children. Among several thousand children found in ancient Egyptian graves, only three instances of caries in deciduous teeth were observed." I have shown many times that the people of today, owing to disuse, have caused the teeth and jaws to degenerate.

A law in evolution handed down from the early Greek fits this condition exactly. Aristotle called it the law of economy of growth, whereby an organ or

structure is lost for the benefit of the organism as a whole; Lucretius showed long ago how the strongest survive and the weak are laid low, or the survival of the fittest; Lamarck called it use and disuse of structures, while Darwin, harmonizing these different views, called it natural selection, and Osborn, in the study of animals, termed it the law of compensation.

Interpreting this law to fit the case in hand, then, there is a struggle in evolution between the face, nose, jaws, and teeth upon the one hand, and the brain upon the other, as to which will obtain the most nutriment. The brain is evolving more highly than the face, jaws, and teeth, while they do less and less work according to environment. Minot says that the face is a modification backward from the lower animals. The brain gains in evolution at the expense of the face, nose, jaws, and teeth, which naturally grow smaller and hence degenerate. Another factor to be considered is that structures like these, which are passing, are transitory and more easily affected by disease. Neurasthenia in the parent and disease in the child produce an unstable nervous system, resulting in excess or arrest of development of bones of the face, nose, and jaws, as well as affecting the structure of the teeth.

Still another law in evolution, by which structures return to their original size, shape, strength, and characteristics, is known in science as atavism, and is called by the farmer "throwbacks." By this law, children reproduce the conditions of their ancestors. Thus a child does not resemble its parents, in general outline or in single structure or organ, but inherits characteristics of an ancestor. This ancestor may be four or five generations remote, or the child resembles its earlier ancestors—the anthropoid ape, with hair covering the body; the lower vertebrates, as the fish, with clefts at the side of the neck, or where a cyclops is born with the pineal eye in the center of the forehead, like some lizards and horned toads. In like manner, it would be an easy proposition for a child to inherit the face, nose, jaws, and teeth,

* DENTAL COSMOS, March 1909, page 384.

or any one or more of these structures, from the primitive races. Patients who display a mouth with thirty-two well-developed teeth, without cavities, and who never use a tooth-brush or mouth-wash, are atavistic as far as face, jaws, and teeth are concerned. This, then, is the source of hard teeth.

It has been shown that in the normal, healthy evolution of man, the jaws, teeth, and alveolar processes degenerate for the benefit of the organism as a whole. The jaws now measure, on an average, two inches instead of two and one-half inches. In the antero-posterior diameter they have become orthognathous instead of prognathous, which makes it difficult for the jaws to contain thirty-two teeth. To compensate for this shortness, the crowns of the teeth have become straighter, the roots do not diverge as much as formerly, the spaces between the teeth in the alveolar process have closed up, and the alveolar process has become long and thin, making it more susceptible to disease. To further compensate for this shortening, one or all of the third molars have been dropped in forty-seven per cent. of my patients. Added to this normal evolution, inherited or acquired diseases modify tooth structure, both external and internal, as observed in defective teeth and interglobular spaces. Diseased tissues cannot produce healthy dentin or enamel. All these changes cause the teeth to be more susceptible to external and internal influences.

If you agree with Drs. Black and Kirk and the writer—namely, that teeth diminish somewhat in strength with advancing age; that when pulps are destroyed, teeth lose strength in a marked degree, and when pulps become calcified, nutrition is cut off and the dentin loses strength, and that tooth degeneration occurs in evolution as already stated—then the remainder of the argument is clear. Is there such a condition as soft teeth? We have shown that the face, nose, jaws, and teeth degenerate for the benefit of the organism as a whole; that these structures are transitory; that transitory structures are more easily affected by disease than normal healthy structures; that

neurasthenia in the parents and disease in the child will cause arrested development of any or all these structures. It is a well-known fact that hereditary syphilis and children's diseases cause a development of imperfect tooth structure. If this be true, will not other constitutional diseases cause the same conditions? Under such environment, a third degeneration in tooth structure is all-important. The tooth-pulp is at its best when it begins to form dentin; as the pulp proceeds with its work, it goes to its own destruction, that is to say, it degenerates. Is it not, then, a splendid organ for disease, locked up in its own cell without escape? After it has performed its office (that of forming dentin), it is in fit condition (senile atrophy) to take on disease.

Some years ago, with Dr. Latham, I made an exhaustive study of the dental pulp. These investigations were presented, at different times, before the Section on Stomatology of the American Medical Association. Over four thousand teeth were cracked open and two thousand specimens of pulps were removed and placed in different fluids for cutting, staining, and mounting for the microscope. I was astonished at the number of diseases to which the pulp was subjected. Calcification was only a very small part as compared with other diseases which we found. Diseases of the bloodvessels and nerves of the pulp produce retrogressive changes of inflammation; abscess; cloudy swelling; fatty degeneration; mucoid, colloid, hyaline, and amyloid degeneration; pulp-stones; spherites; neoplasms; fibroma, etc. I demonstrated nerve-endings in the coats of the pulp bloodvessels, showing the vasomotor system. The sympathetic system in disease, therefore, plays a part for good or evil in nerve-endings and bloodvessels of the pulp. I also demonstrated Wallerian degeneration and nerve sclerosis, showing that changes in nerve-endings and nerve tissue involved the pulp.

If, then, as Dr. Black says, calcification of the pulp causes deterioration of the matrix and discoloration, and the teeth lose strength in a marked degree,

how much more intense must be the action on tooth structure when disease of the bloodvessels and nerve fibers with inflammation, abscess, and all the other diseases enumerated are present!

The question arose at the time these researches were progressing, When and what is the cause of so much disease in the dental pulp? It was found that, when the pulp has finished its work, it became senile. We know that the period of senility differs in different individuals. Some children are born senile. Children become senile at any of the periods of stress, at the eruption of the deciduous teeth, at the eruption of the permanent teeth, at adolescence, and as age advances at the climacteric and at about sixty, when the arteries undergo a change; hence the teeth "diminish somewhat in strength with advancing age," as Dr. Black remarks. When the functions of the body are abnormal from disease, inherited or acquired, it stands to reason that faulty metabolism and auto-intoxication must intensify the poisons in the blood, particularly at the periods of stress, hence the teeth discolor and soften as well. Is it not true that when the lungs, bowels, kidneys, or skin become affected, the teeth and alveolar process are involved? If we could examine the poor, old pulps, we should find them badly diseased also, as the result of which the fibrillæ become destroyed, the organic matrix loses its vitality, the enamel rods split off, and the enamel and dentin soften. Grief, worry, overwork, disease, and pregnancy cause changes in nerve-endings and in the blood stream, bringing about disastrous results.

If, then, as Black states, there "is something in the constitution operating through the oral fluids and acting upon the active cause of caries, hindering or intensifying its effects," why does this "something" not cause changes in the internal secretions and the blood, and thus in disease lower tooth resistance and make it much easier for the oral fluids to act with greater intensity upon tooth structure? From a continued clinical ex-

perience for many years, it is reasonable to conclude that this is the case.

Dr. Kirk, in his article from which we have already quoted, says: "The difference of opinion as expressed in Dr. Black's conclusions on the one hand and those of the great body of clinical observers on the other, may, I think, be fairly attributed to the differences in methods of observation respectively employed in dealing with the question of the physical characters of the teeth." It is the difference in method of observation, or rather an entirely different viewpoint, from which Dr. Black's conclusions are discussed in this paper. As practitioners of dentistry we are reminded every day that there is a vast difference between hard and soft teeth. While it is possible that there is not so much difference but that filling material well applied will partially prevent decay in both classes of teeth, we all know that a tooth which has lost its fibrillæ or pulp cuts differently from one that has a normal, healthy pulp. A pulpless tooth has not the resistance that a healthy tooth possesses. No set experiments, to my knowledge, have ever been made to demonstrate the relative value of filling materials in the two classes of teeth. I believe if the question were put to each practitioner, Which class of teeth would resist decay the best under a given filling material? nearly or quite all would say, The tooth which is normal.

A typical illustration of soft teeth is that of a traveling salesman, twenty-seven years of age, one of my patients, who had a severe attack of jaundice one year ago. He came to have his teeth put in order. I found they had become yellow and soft; decay was progressing rapidly about fillings; in excavating the cavities there was no pain; the fibrillæ were destroyed; if the pulps in this patient could be examined, they would be found diseased and receding in the pulp-chamber.

It is not uncommon to find soft temporary teeth quite yellow, decaying rapidly, and fibrillæ and pulps destroyed. Master J. S., seven years of age, had

measles at five. Recovery was slow; at seven he is not strong. The permanent first molars, centrals, and laterals are in place and are of fairly good quality. The temporary canines and first and second temporary molars are soft, and decay rapidly; the pulps are reached without pain, and the teeth are quite yellow.

I have a record of a number of like little patients. They have all had eruptive fevers, and some have inherited disease.

How do Drs. Black and Kirk know that "These variations are, as a matter of fact, extremely limited in degree?" Is it not true that the physiologic and pathologic condition of the teeth under disease and death of the pulp is just as great as in other tissues of the body according to its structure? Dr. Kirk's fine illustrations do not show a relation between living and dead teeth, so we lose the contrast of the two conditions under the microscope or by polarized light. The results obtained microscopically in senile teeth, as well as pulpless teeth, are at present unsatisfactory. No comparison can therefore be made under such conditions with normal teeth under the microscope by our present methods.

The method of observation of the great body of clinical observers is not based on the mechanics of tooth restoration, but on its own physical condition. It makes little difference from this viewpoint how much or how little variation there is in density, hardness, or chemical composition. We know that the fibrillæ are destroyed under certain conditions, that the teeth cut easily, that there is an odor upon rapid cutting, showing decomposition of animal tissue, and that there is little or no sensitiveness of dentin in many cases, even when the pulp-chamber is reached.

I must offer a different interpretation of the conclusions of Black in regard to tooth structure. The temporary as well as the permanent teeth change their physical characteristics, become soft, and do not resist decay as readily as those in

which systemic diseases are not associated.

Systemic changes in auto-intoxication produce tooth-softening, which is the foundation and great cause of erosion and abrasion, and influence decay. The best illustration of tooth-softening, discoloration, erosion, and abrasion due to auto-intoxication is furnished by those pathologic conditions in which the central incisors, either upper or lower or both, are alone involved. The poisons of the blood circulate to the very end of the bloodvessels, forming a splendid illustration of nerve-end and arterial degeneration. It is also an exposition of the very earliest symptom of auto-intoxication—very often earlier than interstitial gingivitis.

Analysis of the blood does not give reliable information as to changes in chemical composition. We must therefore depend upon the secretions of the body and the behavior of the different organs, such as the heart, liver, kidneys, bowels, etc., for information. Urinalysis should be made. The quantity of urine passed in twenty-four hours must be estimated. If the acidity be abnormal, if indican be present, if forty-eight ounces of urine be not passed in twenty-four hours, those conditions must be corrected. Heart pressure and the condition of the bowels must also be considered.

The physician pays little attention to these early conditions, because the patient is walking about and attending to his affairs. If the disease had progressed to such an extent that some vital organ or tissue had become involved, the physician would consider that he had good reason for interference.

Interstitial gingivitis, disease of the pulp, death of the fibrillæ and pulp, producing discoloration, tooth-softening, erosion, abrasion, and rapid tooth-decay, are very early symptoms in auto-intoxication.

The study of hard teeth and soft teeth, as well as all other structures and conditions of the mouth, is worthy of a broad interpretation.

PHASES OF IMPROVEMENT IN NOMENCLATURE.

By S. D. RUGGLES, D.D.S., Portsmouth, Ohio.

(Read before Section II of the National Dental Association, at the annual meeting, Birmingham, Ala., March 30, 1909.)

IN the presentation of this paper the writer does not wish to rehearse the long list of terms previously considered by this body, but rather to show some means whereby the achievements of your essayists and committees on nomenclature may be put into use more generally by the profession. Time, however, must always be the meter for the perfection of a great science. When we consider that modern dentistry has but passed its first half-century, what has been accomplished seems little less than marvelous. The kaleidoscopic swiftness with which a crude art or craft has taken on the air of a profession is only appreciated by those among us who have helped to bring this about, and little is the wonder that we become impetuous and restless in this twentieth century, famed for its accomplishments.

The fathers of dentistry were, as a class, not men of culture, but simply artisans, adepts in the use of tools and instruments, and, like most of their kind, of limited education. The dead languages were truly dead as far as these men were concerned, yet their vocabularies were sufficient for the demands of their occupation. As a matter of fact there was no great need for special words or terms until after the trade spirit had passed. When it became obvious that future progress depended upon the exchange of ideas, the workers found themselves hampered by the lack of adequate vehicles of expression. Even at the present time a very large percentage of the members of our profession are not college-bred men, and can scarcely be expected to contribute much in a literary

or truly scientific way. Let us not despise, though, the humble toiler, who does well with the means at hand the many delicate and exacting operations intrusted to him, for of men of this sort our state and local societies are largely composed. Men of this type make good listeners, and are usually keen in their appreciation of good essays presented by men better versed in dental training.

During the past ten or twelve years no systematic effort has been made on the part of the many state and local societies to have their essayists conform to standard and recognized terminology, and therein lies one of the greatest stumbling-blocks to impede universal advancement in nomenclature. Within the past decade there was but one paper published in my own state journal, and what is still worse, no standing committee on nomenclature is provided for by our state constitution. Every state and local society should have an active committee, which might also serve in the capacity of an essay committee, and see to it that all papers to be read before the society, and all published matter, should conform to the system adopted by the National Association. The relation of the latter to subordinate bodies may well be the same as is maintained by the French Academy to the lesser lights in France.

When we realize that the vocabulary of the high-school student at graduation is something less than fifteen hundred words, and that a man of education uses about double that number, the wisdom of your committee in eliminating terms is better appreciated, *e.g.* cervical has superseded gingival. The tendency is, and

should be, one of elimination. Custom and usage establish certain words, and their acceptance has to be acknowledged regardless of fitness, as in the case of model and cast, and the verb cement, which is now pretty generally used as a noun.

Granting that the growth of any science multiplies the number of its terms, the reverse seems to be true after a certain stage is reached. In the older science of music, for example, the tendency is now one of reduction and simplification.

After all has been said, it is quite evident, after reviewing the literature of the immediate past, that the most urgent need is not extension of our present list so much as definite knowledge of and familiarity with it. For instance, the word palatal appears very often in our current reading matter. It is neither anatomically correct nor so euphonious as the more accurate lingual. In proportion as we are careless about tolerating the use of words made obsolete by the eliminating process of those in authority, just so long will progress be slow.

Allow me to call your attention to a few terms that have been accepted, yet do not exactly fill their mission. The word abrasion is defined as "The wearing away of tooth-substance either by attrition or through the action of sharp particles in tooth-powder." There is something lacking in this definition, for the majority of these so-called abrasions are accompanied by conditions so much like erosion that some word is needed to express this process, even if its real cause is obscure. The accepted definition will cover a simple case of abrasion, but some adjective is needed to differentiate between that and the condition just referred to. "Complex abrasion" would at once convey the idea, and is self-explanatory. Since the etiology is not well established, it could serve a temporary purpose at least.

The writer regrets exceedingly that the word substitute was not accepted instead of dummy. Since this is a term used largely before patients, it should express or convey the real idea in question.

Either as a noun or verb, the idea cannot be misconstrued if substitute were used.

Approximal is another word in bad form, in spite of Dr. White's efforts to have it accepted. In the formation of compound words it is very cumbersome. Proximal is much the better word, and was recommended by your committee in 1893.

Although the sciences in general favor the Greek language, on account of its multitudinous forms and the delicacy of meaning it is capable of expressing, we do not find the Greek equivalent to some of our terms most commonly used. The Latin has loaned us roots whose use is now well established. Our French and German co-workers have used terms in their language which have become acceptable to the profession in general. Indeed, we have appropriated terms from the Chinese down to the present-day vernacular. Our nomenclature should be broad enough to embrace all useful words, regardless of their origin.

Since this is an era of specializing, and dentistry has joined the procession, cannot these specialists best choose the words for their own particular fields?

Dr. Wilson has made very valuable suggestions in prosthetic dentistry, as have others in orthodontia, operative dentistry, etc. Perhaps no single man has done more toward bringing order out of chaos than Dr. Black, but even he freely admits, in his last work, "Operative Dentistry," the lack of correct expression for certain conditions.

Operative dentistry is, I believe, better equipped with a nomenclature than is any other branch of our work, and yet the majority of essayists will use a blackboard, if one is convenient.

Immediately following the World's Columbian Dental Congress at Chicago, the Northwestern University Dental School had a pamphlet issued for its students, containing a list of twenty-two words, thirteen nouns and nine adjectives. These words constitute by far the best part of our nomenclature to the present day, for there is no limit to their range of application. In 1897 this subject was brought

before the Ohio State Dental Society, and three hundred copies of this pamphlet were distributed among its members. For several months after this meeting requests came from different parts of the state for extra copies. This indicated a far greater interest in the subject than was at first suspected. The Institute of Dental Pedagogics has published a glossary of dental terms, under date of January 1, 1909, which is more general than any I have yet seen, but omits the terms used in orthodontia and porcelain work. No mention is made of the nomenclature of instruments. Every practitioner knows the inconvenience occasioned by the arbitrary methods of the manufacturers in the constant changing of numbers. Perhaps one's next order of the same number will bring a different instrument. This subject has been consid-

ered by the National School of Dental Technics, and a very accurate and comprehensive system adopted. This is needed more by teachers, no doubt, than by any other class, but will be a great aid to all who appreciate system.

The Transactions of this association have been published at intervals covering a great many years. While an isolated copy of the proceedings of one year occasionally falls into the hands of most dentists, there are few who have access to complete files for reference. I should like to recommend very strongly, in closing, an official publication of the list of terms accepted up to date. A reliable dictionary of medical and dental terms for the dental student might follow. If the present interest in the study of dentistry continues, the next few years should make this possible.

ON THE CRYSTALLINE STRUCTURE AND THE PHYSICAL PROPERTIES OF SOME FINE GOLDS USED IN FILLING TEETH.

By A. FENCHEL, Sc.D., L.D.S., Hamburg.

THE known physical properties of gold are: Atomic weight (1907), 197.2; specific gravity, 19.32 to 19.6. Fusing-point, 1063.5° C.; specific heat, 0.030° ; heat of fusion, 12.6° ; absolute calorific conduction, 0.70. Mean coefficient of linear expansion, 0.000014. Absolute tenacity, annealed, 7 to 8 kgm. square; cold hardened, 28 kgm. square. Temper, 2.5. Electric resistance, 100 m. 1 mm. square, 21 ohm. Electric conductivity at 0° , 461000 (according to Wuest).

Gold melts to a light green liquid. It can be beaten out to a thickness of $1/9000$ mm., and is then pervious to green light rays. In wire form it can be drawn out to 2000 m. per gram. Gold crystallizes, like silver and copper, regularly, in small crystals among which cubes, octahedrons, and rhombic dodeca-

hedrons are most frequently found. In photographs gold can therefore not be distinguished from those metals, unless it has been previously treated (Fig. 1), while platinum is more easily distinguishable by the form of its leaflets and granules (Fig. 6).

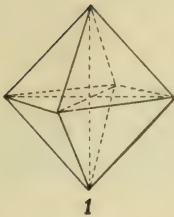
In nature, gold is almost always found in combination with foreign metals, from which it can be separated by nitric acid, which dissolves them to nitrates. Gold is easily soluble in aqua regia. From solutions of its salts gold is precipitated in the form of a metallic brown powder (Solila, etc.) by any reducing agent (ferrous sulfate, stannous chlorid, oxalic acid), also by almost all metals, gold being the noblest. All its compounds are decomposed at high temperature, whereby the gold is always reduced to the metal.

The filling of teeth with metal foil has been practiced from early antiquity. Lead, which was originally used, has been replaced by gold foil in the last century. Gold foil has been manufactured for centuries for the various purposes of painting and gilding. The gold-beater's trade is an exclusively German trade, which for centuries has been maintained in its originality especially in Middle Franconia, Nuremberg, and Fuerth. It is one of the few trades which has remained intact through all the innovations of progressing technics. Experiments were not lacking to replace manual labor by machines, but these experiments failed

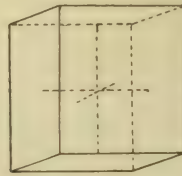
anvil with a heavy iron hammer, until the sheets have reached the size of 5 cm. square. These leaflets are then laid in a book of gold-beater's skin, and according to the thickness of the foil desired are beaten to the size of 14 cm. square. In order to produce gold cylinders and gold pellets, the gold foil is cross-hatched by laying two sheets between straw-paper and allowing the latter to carbonize, whereby the small unevennesses on the surface are produced. The sheets used for gold cylinders have a thickness of $1/125$ to $1/800$ mm.

Platinum-gold foil is produced either by alloying the gold with platinum or

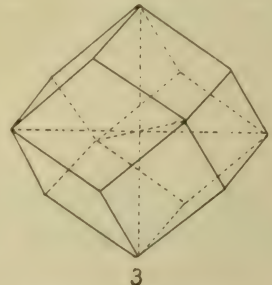
Main forms of gold crystals.



Octahedron.



Hexahedron.



Rhombic dodecahedron.

owing to the lack of elasticity in the beat such as is produced only by the human arm. The mechanical beating tore the gold as soon as it had reached a certain thinness, and at the same time the very delicate and extremely expensive gold-beater's skin was destroyed. Gold-beater's skin consists of a very fine cuticle prepared from the cæcum or blind-gut of the ox, which is cleaned, stretched, dried, and washed in alum-water, after which the skins are painted with wine in which isinglass has been dissolved. Finally the skin is coated with albumin.

According to Herbst, the procedure of beating gold is as follows: Chemically pure gold is rolled out to a thickness of 0.03 mm. This sheet is cut in pieces 15 mm. square, of which 330 are laid in a book of gutta-percha leaves so that the squares lie one over the other in the middle. This book is beaten on a stone

by superimposing thin gold and platinum foil. The latter is used for taking matrices for porcelain fillings, the former for fillings. Herbst says, on page 292 of his "Methods and Improvements": "Gold fillings made of cylinders or pellets exclusively often become rough and unsightly after some years, especially if very large cavities have been filled with them." Herbst therefore recommends making the surface always of foil.

In the first supplement to his "Methods and Improvements" Herbst offers further data on gold as a filling material. According to him, gold has the property of cohesion, if it be chemically pure and thinly beaten. This explains the cohesiveness of gold after it is taken from the gold-beater's skins. The question suggests itself, why gold has no more cohesiveness later on, or after having been alloyed. Herbst, in his categorical

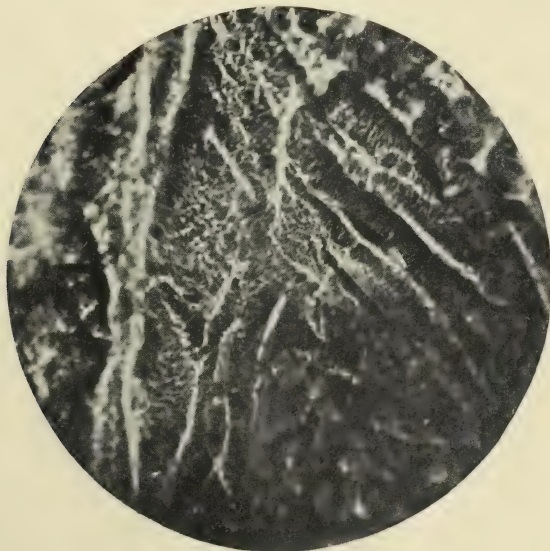
way, answers this question as follows: gold come into contact, which explains "Gold in time is covered with a thin the impossibility of cohesion," etc. He

FIG. 1.



Herbst Orange gold ($\text{Au} + \text{Ag} + \text{Ca}$) for gilding ($1/9000$ mm.), unannealed. Magn. 160 diam.

FIG. 2.

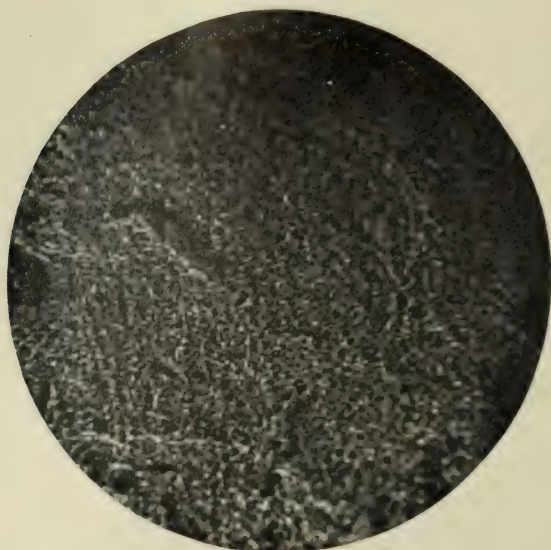


Herbst gold foil No. $2\frac{1}{2}$, for gold cylinders ($1/800$ mm.), annealed. Magn. 160 diam.

layer of vapor or air. Thus, as it were, compares the cohesion of gold with the two layers of air and not two layers of cohesion of iron in welding, and attrib-

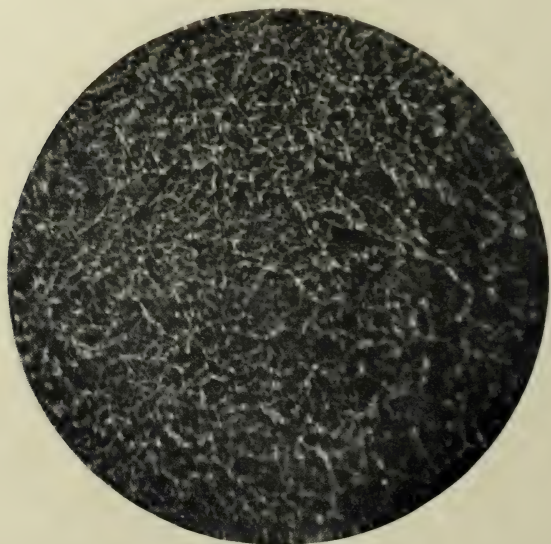
utes the effect of annealing, by which of the opinion that iron by being an-
non-cohesive gold is rendered cohesive, nealed is rendered weldable only because

FIG. 3.



Herbst gold foil No. 4, with admixture of silver for filling ($1/640$ mm.), annealed. Magn. 160 diam.

FIG. 4.



Herbst gold foil No. 30 ($1/80$ mm.), annealed. Magn. 160 diam.

merely to the removal of the moisture on the surface. Herbst further seems to be by the annealing a layer which before had impeded the welding is removed.

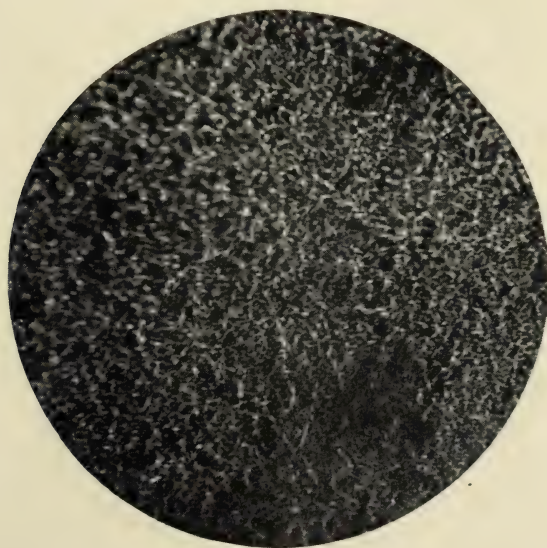
At page 299, moreover, Herbst says: is set on fire. The gold is thereby heated
“In order to render gold semi-cohesive, in a very even way, sufficiently to become

FIG. 5.



Herbst gold foil No. 30 ($1/80$ mm.), unannealed, but apparently heated, as the crystals are in process of isolation. Magn. 160 diam.

FIG. 6.



Herbst gold-platinum foil No. 30 ($1/80$ mm.), alloyed for taking matrices, in foil and granule form. Magn. 160 diam.

it should be laid in a porcelain bowl air- and vapor-proof, but not so that it
and covered with sulfuric ether, which could become especially cohesive—keep-

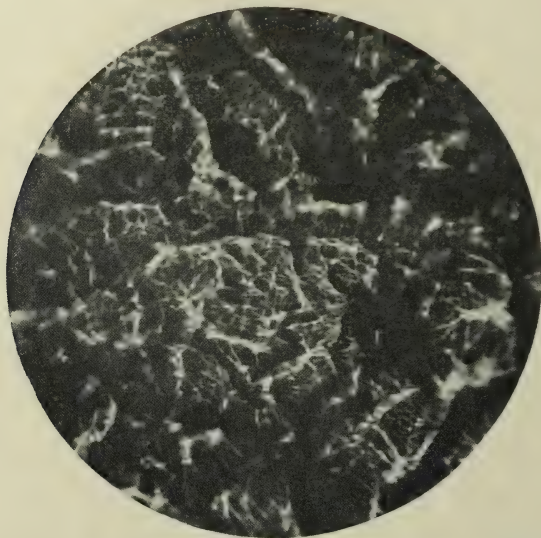
ing, as it were, the medium between cohesive and non-cohesive gold." In order of the separating layer (pp. 329-331). Finally, Herbst says that the Universal

FIG. 7.



Herbst gold foil for Universal gold rolls, No. 10 ($1/240$ mm.), unannealed.
Magn. 160 diam.

FIG. 8.



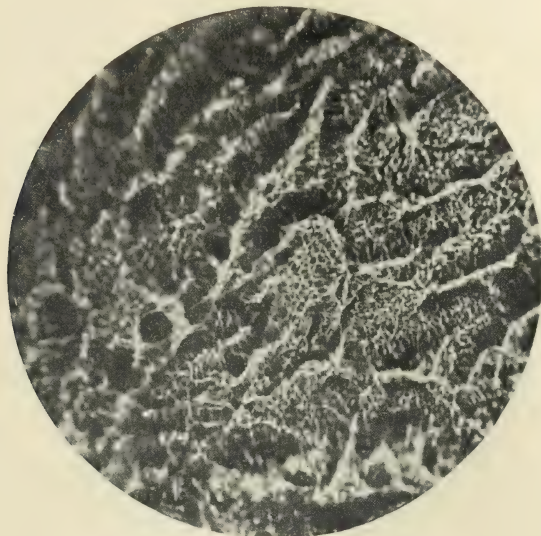
Same as Fig. 7, but annealed. Magn. 160 diam.

to be logical, Herbst in this case would then have to assume the partial removal gold rolls, instead of, as formerly, of No. $2\frac{1}{2} = 1/800$, are now manufactured of

No. 10 = $1/240$ mm. This gold shows a quite extraordinary soft and loose struc-

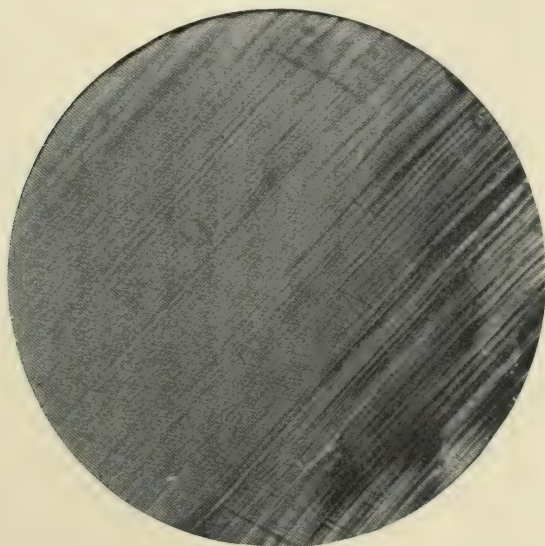
In examining these different sorts of gold, in which were included some sorts

FIG. 9.



Herbst gold foil for Universal gold cylinders, No. 10 ($1/240$ mm.), annealed. Magn. 160 diam.

FIG. 10.



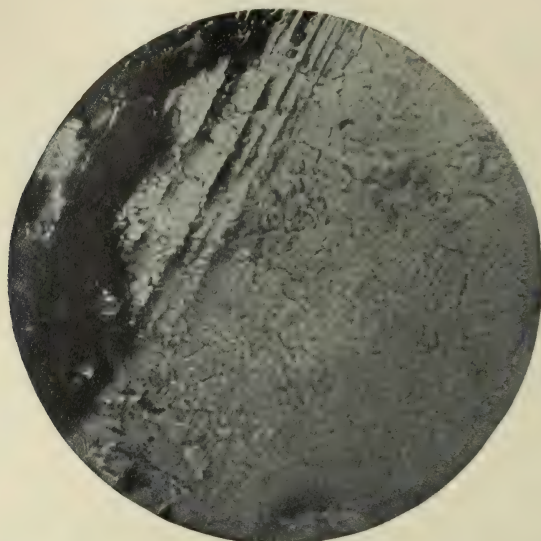
S. S. White Globe gold foil No. 40, unannealed (non-cohesive). Magn. 160 diam.

ture. How this structure is obtained can unfortunately not be communicated, as it is the manufacturer's secret.

of S. S. White, also Solila, and Hoepfner's Velvet gold, many peculiarities were revealed. It was the author's sole

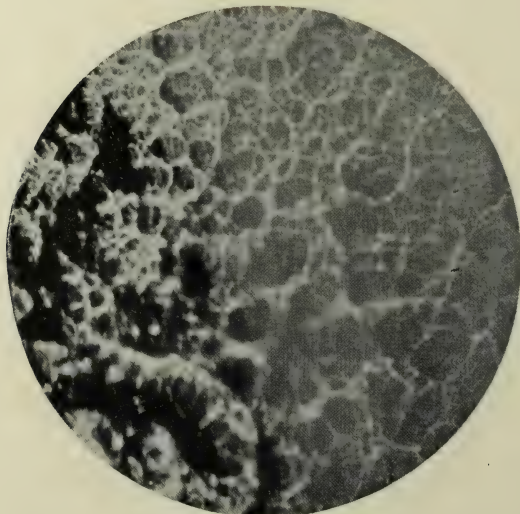
object to demonstrate the structure of these golds and to explain the photomicrographs with some theoretical annotations. After these questions have become elucidated in time to come, we shall know how the structure of a par-

FIG. 11.



Same as Fig. 10, but annealed (cohesive). Magn. 160 diam.

FIG. 12.



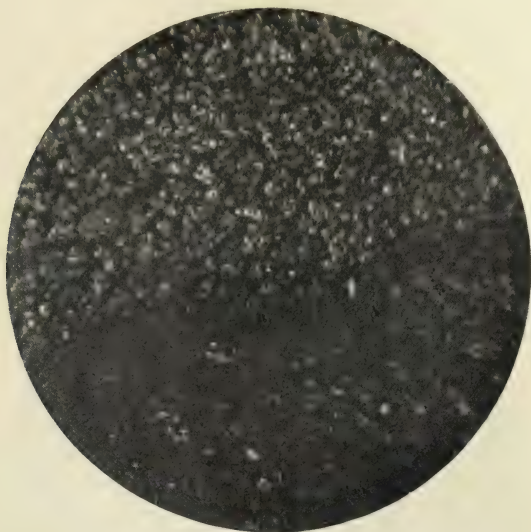
Williams' gold foil No. 40, annealed (cohesive). Magn. 160 diam.

tions. The relationship of the causal connection between the structure and the working properties the author would leave to the consideration of more skilled particular gold influences its working qualities, and its suitability will be determined under the microscope before its application.

Hoepfner's Velvet gold (Fig. 15) occupies a place of its own in regard to its structure; it is said to be very similar

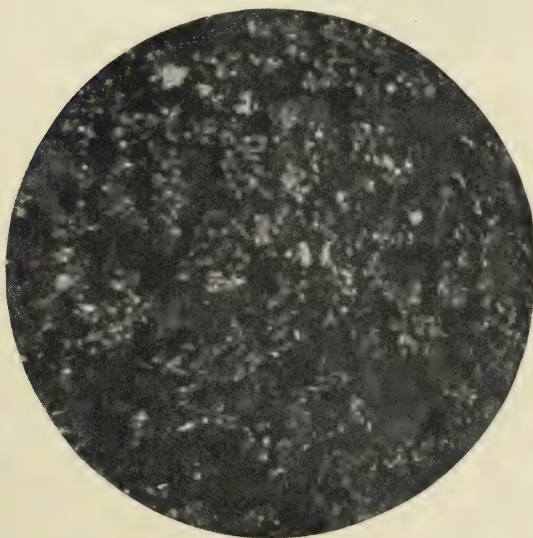
Dr. Hoepfner writes as follows: "In the manufacture of velvet gold only pure gold is used, and all contact with other

FIG. 13.



De Trey's Solila, small crystals. Magn. 300 diam.

FIG. 14.



Same as Fig. 13, but large crystals. Magn. 300 diam.

to the S. S. White Moss Fibre gold. Unfortunately the author has had no samples of this at his disposal.

About the manufacture of Velvet gold,

metals is avoided. The apparatus, therefore, consists in all the metal parts exclusively of pure gold, which renders the manufacture more expensive owing to the

losses involved. As velvet gold consists exclusively of pure gold, it has all the physical qualities thereof. The velvet gold previously to being put on the market is heated to something above 200° C. and is then soft and pliable. Under the hammer it becomes hard. Also after lying for a long time (about six months) it seems to gradually assume a hard consistence. Heating to 200° C. is sufficient to restore its former softness. The "specific softness," as it were, of the gold

cific cohesion of the gold, although unfortunately this is never done in the papers published. Finally, according to the duration of the precipitation of the gold the thickness of the layer can be regulated." These are the brief statements of the inventor, who of course is not to be blamed, any more than Herbst, for not exposing to imitation the peculiarities of his technique.

A comparison of the photomicrographs of the individual sorts of gold allows of

FIG. 15.



Hoepfner's Velvet gold. Magn. 300 diam.

itself, which is wholly due to its purity and to the heating, is different from the structural softness. The latter is due to the mode of precipitation in the solution, which is best compared with falling snow. [Consequently a saturated solution is used at high temperature, and precipitated by cooling.—Author.] The technique of manufacture has a great similarity to this phenomenon. The falling of the flakes can be controlled to a considerable degree, and the precipitation of the gold can be influenced so that softer or more compact masses are precipitated as desired. The cohesiveness can also be regulated—that is, of course, only the structural cohesiveness, which should be distinguished from the spe-

certain conclusions as to their properties as manifested in their structure. Undoubtedly Hoepfner's Velvet gold (Fig. 15) is the most cohesive of them all. The S. S. W. moss fibre gold is said to be on a par with it, also the so-called Portland gold of George Chalk, London. These two golds the author has not yet examined, and his observations on these, together with those on others, will appear later.

As second in cohesiveness, Herbst's Universal gold annealed (Figs. 7-9) may be considered. Also in Williams' gold, according to the photomicrograph (Fig. 12), a strong cohesive power of the crystals may be surmised. From a comparison of the structure we can therefore con-

clude: The looser the crystalline structure of a gold and the larger its crystals, the greater its cohesiveness. To this a further observation is to be added: The surfaces of beaten or rolled gold, such as Herbst's Universal gold No. 10 (Fig. 7), or the S. S. White Globe gold No. 40 (Fig. 10), in unannealed non-cohesive state show hardly any crystalline structure. (The coarse lines are folds.)

As soon as these golds are annealed, the photomicrographs show a quite distinctly developed crystalline structure (Figs. 8 and 11); at the same time the gold has become cohesive. If we consider what has been said above regarding the cohesive power of the individual golds, and if the photomicrographs are compared as to the size of the crystals and the thickness of the sheets, another consideration suggests itself. In the sheets of $1/800$ to $1/240$ mm. thickness, on measuring in the photomicrograph, crystals of from one to three mm. diameter are found after annealing. This, in the photomicrograph, which is magnified 160 times, corresponds to a thickness of the foil of from $1/160$ to $1/50$ mm. The foil, then, after annealing has about five times its former thickness, the crystals probably not being very different in their diameter in different directions. From this the question arises, What changes have taken place in the foil?

In the original state of the foil after beating, owing to its thinness, crystals of such dimensions can be present only in a flattened state, while our photomicrographs of the annealed foils clearly show the edges and the body of the crystals which protrude above the surface. We can therefore answer the question as follows: Annealing of the gold re-establishes the shape of the crystals which have been flattened in beating. With this we come back to the simple way in which Herbst explained the effect of annealing. In my opinion it is a little too simple to essay an explanation of one of the most curious physical phenomena, *i.e.* the cohesion and its loss, of the individual gold crystals—in short, the welding of gold in a cold state by a layer of air and vapor, and its removal.

I have of course no intention to advance like Herbst a theory in such categorical fashion, and I am fully aware that the following explanation still allows of many conjectures. The mysterious cohesion of metallic crystals presupposes the presence of a mass of energy in the individual crystals which, like magnetism, binds crystal to crystal in such a way that the bound metallic mass receives the properties which we designate as absolute solidity. Heat diminishes the "cohesion." This fact, *i.e.* the abolition of cohesion by a supply of new masses of energy, permits, to be sure, also of the opposite conclusion, namely, that cohesion is a property of the crystal aggregates, *i.e.* the metal masses themselves, and that the influence of an intrinsic power of the crystals, as it were, enables them to stand on their own feet until by beating, pressure, or cooling, crystal is again bound to crystal. Accordingly, we see in iron, for instance, that at red heat the combination is loosened in such a way that the metal becomes soft, pliable, and weldable. In all metals, by the influence of heat the crystalline combination is loosened, so that finally the smallest units of the crystals which form the metal assume an independent existence, and owing to this independence and mobility the metal becomes liquid. While most or perhaps all other metals, as the cooling advances, arrange themselves again to form a cohesive combination—that is, become firm and fully rigid—gold is an exception in this respect. Gold after annealing, as has already been shown, exhibits an absolute rigidity of only from 7 to 8 kgm.; after being hardened in a cold state, however, four times that amount. Our illustrations show that, in gold, annealing really isolates the crystals which before were bound together as in Fig. 10, and could not be recognized as shown in Figs. 11, 12, 8, etc., as compared with Fig. 7. Gold retains this state of isolation for a long time after cooling, and consequently also the property of cohesiveness—that is, weldableness in a cold state. Cohesiveness is therefore to be regarded as a property

or a form of energy in the crystals, which are released from their combination by the influence of heat. Whether the cohesiveness has been formed from the heat, or whether the heat only plays the part of the releasing lever, or whether both occur together, is not to be decided here.

For the rest the illustrations speak for themselves. The number of preparations examined is only small, yet if the manufacturers of filling gold are willing to profit from these suggestions, the author is always ready to subject any preparations submitted to a photomicrographical examination.

RESTORING FACIAL CONTOUR AND CLOSING OPENING OF PALATE AFTER OPERATION FOR REMOVAL OF SUPERIOR MAXILLARY.

By **HOWARD T. STEWART, D.D.S., Greenville, Miss.**

THE accompanying figures illustrate an appliance made for restoring the facial contour and closing the opening of the palate into the nares, and

tion to the fact that the photograph represented in Fig. 2 was retouched by the photographer, as is usually done in the ordinary photograph to make a more

FIG. 1.



Photograph representing face as it appeared before appliance was inserted.

FIG. 2.



Retouched photograph showing face with appliance in position.

for supporting the eyeball, which had dropped to a considerable extent.

In the beginning I wish to call atten-

pleasing appearance. This of course has eradicated the small blemishes and makes a greater difference in appearance than

otherwise would have shown, but so far as the position of the eyeball and the contour of the face is concerned, the result is practically as shown by the two illustrations.

On account of an operation for sarcoma some three years before the appliance was constructed, the floor of the right nostril had been divided all the way back, the nasal and malar processes of the superior maxillary bone had been divided and the bone removed, together with the greater part of the floor of the orbit.

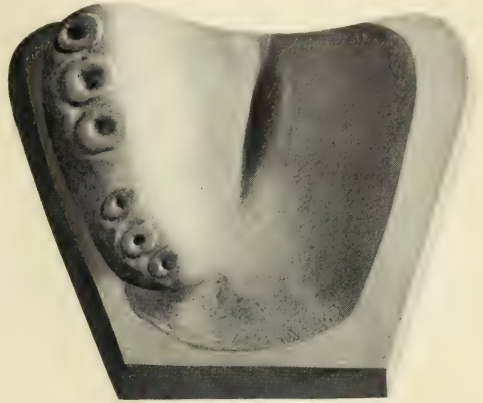
On account of the lack of support the eyeball dropped down greatly and the cheek was much sunken, giving a terrible expression to the face, as shown in Fig. 1. A large opening through the palate into the nares made speech very difficult and almost unintelligible.

After considering everything of which I had ever known or could then learn, I finally determined on the following method of procedure:

All the teeth on the right side having of course been removed with the bone,

left central to be so denuded that its extraction became necessary. We then

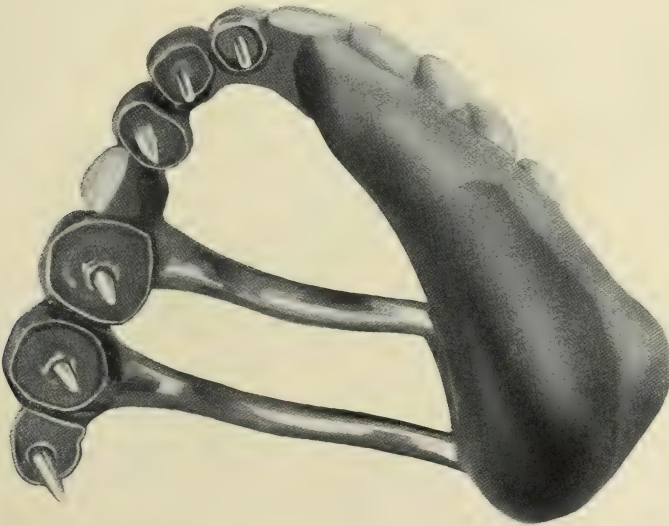
FIG. 3.



Model of the mouth (showing opening through palate) as it appeared after the teeth were excised and roots prepared for bridge.

had all the teeth on the left from the lateral back to the third molar except

FIG. 4.



View from above of appliance without plate.

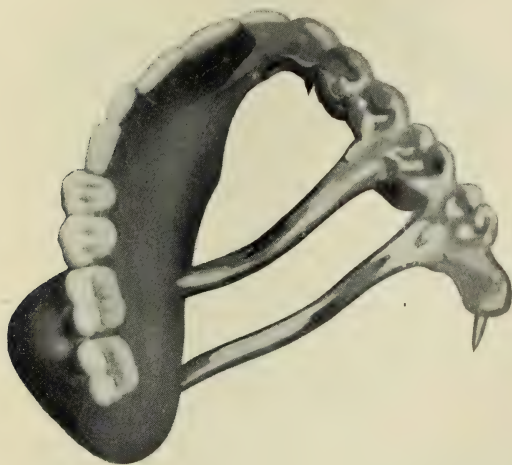
we had only those on the left. The operation had caused the remaining

the second bicuspid, which was missing. All these were excised at the gum mar-

gins as for ordinary Richmond crowns. Great care was exercised in trimming

tion of the gums. Fig. 3 is a model of the mouth, showing the opening of the

FIG. 5.



View from below of appliance, showing bars extending across roof of mouth.

FIG. 6.

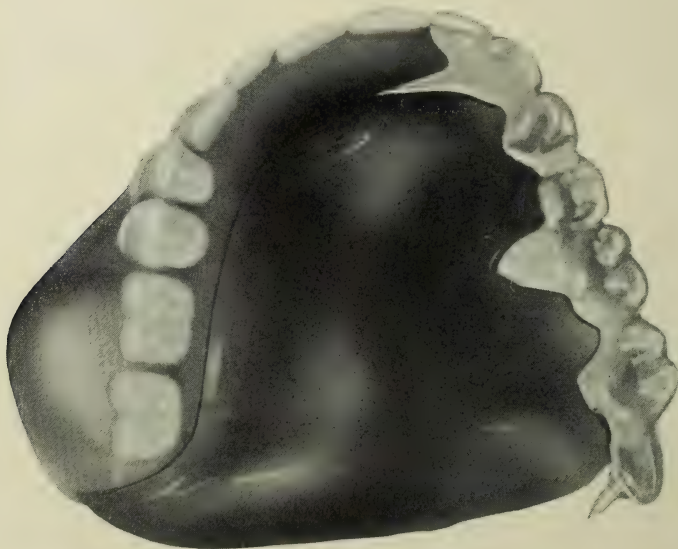


Plate with spring clasps to snap over bars on appliance.

these roots to a *conical* shape, and in adapting the bands so as to have ample

palate into the nares, and the roots prepared to receive the bridge. Richmond

FIG. 7.



Appliance with plate in position on bars.

cervical approximal space (more than really existed normally) and no conges-

crowns were made for the lateral, cuspid, and bicuspid, and solid gold crowns for

the molars. All these crowns were then soldered together. The heavy bars shown in Fig. 5 were soldered to the bridge and extended across to the opposite side. Vulcanite was attached to these, as seen in Fig. 4. To ascertain the shape and size that this vulcanite should be, a bulk of sticky-wax was first used to try in the mouth. This was trimmed off and added to in various places until the best contour of the face was obtained and until the eyeball was raised to the fullest extent that seemed advisable. This was reproduced in vulcanite. A plate was then constructed with clasps to snap in place over the bars and to approximately restore the normal shape of the palate lingually. Fig. 6 shows the plate itself, and in Fig. 7 it is shown in position on the bars. This plate may be removed at will by the patient to cleanse the mouth and the entire appliance, which is easily done. Floss silk tape can easily be carried over the upper surface of the vulcanite and the bars. The appliance was then cemented into place.

Much care was taken as to the occlusion of the opposing teeth. A close study of the mechanical principles involved in the resistance which this appliance af-

forded in restoring the contour of the face and in raising the eyeball approximately to its normal position will be interesting to those who grasp it in all its details. It will be observed that the downward pressure of the tissues of the face, being considerable, would tend to rapidly elongate the teeth in their sockets, moving most rapidly from the median line back. This tendency was overcome by the bars extending across, the downward pressure thereby being resisted by every tooth, which would have to be turned *buccally* out of its socket to allow the opposite ends of the bars to be depressed.

It was with considerable anxiety that this appliance was placed in position in the mouth, but two years' constant use has resulted in nothing that would cause fear for the permanence of the work. The result has been all that could reasonably be expected, and the patient is very grateful.

Fig. 1 was taken immediately before cementation of the piece, and Fig. 2 immediately afterward. There has been considerable improvement in looks since then, as the tissues do not appear so tense as they did at that time.

DENTAL SCIENCE A PART OF UNIVERSAL LITERATURE.

By G. S. VANN, D.D.S., Gadsden, Ala.

(Read before Section II of the National Dental Association, Birmingham, Ala., April 1, 1909.)

THE word literature is used in two distinct senses. Its first and literal meaning is, something written—from the Latin *littera*, a letter of the alphabet, an inscription, a writing, a manuscript, a book, etc. In this general sense the literature of a nation includes all the books it has produced, without respect to subject or excellence.

By literature in its secondary and more

restricted sense we mean one special kind of written composition, the character of which may be indicated but not strictly defined. Literature of this nature is occupied chiefly with the great elementary feelings and passions which are a necessary part of human nature, such feelings as worship, love, hate, fear, ambition, remorse, jealousy. These feelings are common to man, and through them men

separated by education or surroundings are able to sympathize with or understand each other. Literature expressing and appealing to such feelings shares in their permanence and universality. In the poetry of the Persian Omar Khayyam, of the Greek Anacreon, of the Roman Horace, and the English Robert Herrick, we find the same familiar mood. Each is troubled by the pathetic shortness of human life, each shrinks from the thought of death and tries to dispel it with the half-despairing resolve to enjoy life while it lasts. Neither time nor place prevents us from entering into the work of each of these poets, in many respects so widely separated, because they express a common human feeling, which we can understand through imagination or experience. So the *Oedipus* of Sophocles and the *King Lear* of Shakespeare, though written centuries apart, appeal to people of all classes and climes, treating as both do of that elementary feeling of love between parent and child, and while that feeling lasts those immortal portrayals of it will be admired and understood.

Works of literature in this limited, higher sense, therefore, are like music, painting, or sculpture, mainly concerned with the feelings—that is, they aim to please, to awaken thought, feeling, or imagination, rather than to instruct—and in this are distinguished from the books of knowledge, or science, whose first object is to teach facts. This distinction between literature and science was laid down in a famous passage of DeQuincey: "There is, first, the literature of knowledge (*i.e.* science), and secondly, the literature of power. The function of the first is to teach; the function of the second is to move. The first is a rudder, the second an oar or a sail. The first speaks to the mere discursive understanding or reason, the second speaks ultimately, it may happen, to the higher understanding or reason, but always through affections of pleasure or sympathy." In a word, then, to ascertain, and communicate facts is the object of science; to quicken our life into a higher consciousness through the feelings

is the function of art. Yet, however good this distinction may hold as a rule, much that is literature in the strictest sense does deal with facts, whether of history or of science—that is, being expressed in a form of permanent beauty or value it is lifted out of a special department of knowledge and made of universal interest. Shakespeare's historical plays, Carlyle's *French Revolution*, or an essay of Bacon, DeQuincey, or Macaulay, while they tell us facts, are, as we well know, strictly literature; also many of the works of science—political, professional, and otherwise—fulfil these conditions and are included in this class.

Fortunately for us who are present here as members of this organization, and for the profession at large, the men in whose minds was conceived the idea of dentistry as a profession held this high standard of literature. That the divine energy should incarnate itself and find expression in the form of men, and that these men should inspire each other to think and write, to do and dare, is a subject the contemplation of which should make us stand uncovered. It was in this spirit that the first dental college was established, the first society organized, and the first journal published. Let us bear these facts in mind—not primarily, however, because they were the first, but because (and this is the great reason) here was the beginning of a change of spirit as well as of method, a change from a trade always mindful of self, accumulative, afraid of competition, exclusive, gaining knowledge only to hoard it, to a profession with broad fraternal feelings and with intellectual culture.

Thus was created an atmosphere in which professional life began to live and move and have a vigorous being, and bring forth a literature that was a fitting complement to the great fabric of scientific thought and expression that was built up during the first half of the last century, the dental phase of it taking on a compact and permanent form when Chapin A. Harris issued the first edition of his "*Principles and Practice of Dental Surgery*." This was successively followed by Garretson's "*System of Oral Sur-*

gery," Burchard's "Dental Pathology," and Gray's "Anatomy"—three works which have a philosophic insight into truth, and are set forth in a most satisfying literary form. The French writer Magitot, and the scholarly Tomes of England were also writing at this time, both producing standard works; the former a treatise on "Dental Anomalies," the latter a "Manual of Dental Anatomy, Human and Comparative," which for precision of thought and finish of style is possibly not excelled by any other single production of a scientific nature.

While these men were removing the stigma of empiricism from dentistry by discovering the principle of rational connection between a vast assembly of disjointed and inco-ordinate facts and theories, in which what was sound and true was often linked to what was false and contradictory, the younger members of the profession were hastening their day by working along individual lines. Conspicuous among these are E. H. Angle, V. H. Jackson, and Calvin S. Case, specialists in the field of orthodontia. Each of these men has a different story to tell, and each has told it in his own way, bringing many rubrics of thought to bear upon the subject, and proving by the incontestable logic of results the soundness of their respective theories. Together they have lifted the department of orthodontia from a dependency to a secure partnership with dental science and literature.

However interesting the later subjects may have proved to the general practitioner, the soul of the profession, with all its growing powers, from its inception has been centered upon the solution of the great problem of dental caries. Not only the leaders of thought, but even the lives and struggles of the mass of men who toiled daily at the dental chair, were pregnant with the question, until, within the last few years, through the labors of the great triumvirate—G. V. Black, W. D. Miller, and J. Leon Williams—the question has been settled. These men each approached the subject from a different point of observation, and with intellectual proceedings calm, patient, and

regular, they mastered the subject, pursuing cause and effect with a steady tenacity through multitudes of details that would have checked other men with less mental ardor and lacking the same invincible persistence. As a consequence, each one of these men has made the profession his profound debtor by recording the result of his researches in a brilliant series of essays that are not only a restrained, lucid, and logical exposition of the subject in hand, but from a literary standpoint are the peer of any from the time of Bacon to the present. That is to say, these men in the treatment of their subject are no longer merely dentists, operators, scientists—they are pre-eminently thinkers, able to rise above purely contemporary interests and stand out alone, each in the genius of his own individuality: Black, the direct and forceful logician; Miller, the subtle metaphysician, and Williams, the master of a rational style that approaches prose poetry in its harmony of thought and expression, wealth of illustration, and inexhaustible fertility. To some degree the unprecedented enthusiasm with which their work was received within professional ranks may, of course, be attributed to the subject upon which their writings are engaged; but beyond this, and speaking broadly, it is due also to the fact that they brought to the discussion of that subject distinctive literary gifts, and feelings for style which enabled them to express their thoughts in a form of lasting value and literary interest.

In an exhaustive review of dental literature other standard contributions might be added to the list, but a sufficient number have been noted to emphasize the point that the works of dental literature have a beauty, power, and individuality of expression that is all their own, and that help to make them both permanent and universal. Not only is there value in the thought contained, but there is a distinct and added value in the special form in which the thought has been embodied. Each writer has his own style or manner, his characteristic way of addressing us. This style is the expression of his personal character, and we have

learned to know him by it, as we recognize a man by his gait or by the tone of his voice. Thus through this personal element in their work the great writers of dentistry have expressed to us a part of their inner selves—indeed, have been impelled to give us, as best they could through written words, the most they have gained by experience. In the poet's verse we have long been accustomed to read the lesson of the heart which he has learned from living; it is warm and alive for all time with his sorrows, exaltations, hopes, and despairs. And now, in the essay of the scientist, we are coming to read the innermost thoughts of his mind gained from toil of research and from experience. It is in this sense that literature is born of life and we come to look on the works of each great writer as an actual part of a human life mysteriously preserved and communicated to us.

But we must go still farther, and realize that each nation as well as each individual has a distinct character and inner life; that in generation after generation men and women have lived who have embodied in literature not their own souls merely, but some deep thought or feeling of their time or nation. Often thousands feel dumbly what the great writer alone can express. Accordingly literature is not only personal but national. The character of a nation manifested through action we commonly call its history; the character of a nation written down in its books we call its literature. For more than twelve hundred years the English nation has been revealing its life, and way of looking at life, through its books; to study English literature, therefore, is to study one great expression of the character and historic development of the English race.

What is true of national life is particularly true of professional life; and, as we have seen, for nearly a hundred years the makers of dentistry have been setting forth its advancement in its literature; in such a manner has the progress of the last century been crystallized for thought and study. But with the passing of the century a change has been apparent.

Whereas a decade or so ago the profession was judged by the individual efforts and achievements of a few representative men, today the demand is being made that every man measure up to the standard, fill his place with skill and genius, and share the general responsibility. The cry is being heard on all sides, and although at present the superior tasks—the finishing and molding of nearly all great undertakings—are still delegated to the comparatively few, yet the thinking element has already begun to regard the higher fields of achievement as too great territory for sole occupation by the minor portion of the profession, and are beginning to provide for the development of that spark of genius which, barring the idiotic and hopelessly insane, resides in every man's bosom. This, however, is but in keeping with the progress of the age, which through the industrial activity of the nineteenth century has given man a new material environment, upon the plane of which the twentieth century must develop for him a higher intellectual and spiritual surrounding. This is the proposition before the world, in the presence of which it might well stand agape were it not for the fact that the way of advancement is already opened up through the evolution of the public school system, with its departments of mental, manual, and artistic training, out of which the candidate steps into a college for higher intellectual and special development, from which he is graduated into the organized ranks of his chosen calling.

This is the cycle of progress that has been begun, and the question that confronts the dental profession today is, whether as a whole we are keeping abreast with its advancement. To my mind the question resolves itself into two phases, that of education and that of organization. With regard to the first, listen to the outline defined by President Eliot of Harvard of what constitutes a liberal education—"A clear conviction in discovering and recognizing the truth, a development of the imagination, and a literary power of expression"—and be encouraged that, with the prerequisites

being established by the dental colleges and boards of examiners, it is possible for the student body of the next generation to reach this degree. This leaves the question of organization with *us*—in consideration of which may I call attention to the Illinois State Dental Society's postgraduate study course, promising as it does to be far-reaching in its effect upon associational work and in the dissemination of the knowledge of dental literature; which, together with the plan providing for inter-related membership of the local with the state society, and the state with the national body, may attain to the ideal basis upon the platform of which every member of the profession may be led to stand in the reorganization of associational work as a whole.

Here, again, as in the beginnings of dentistry, we see that the standard of progress is broader fraternal feeling and higher intellectual culture. And that the latter may be as great as possible, let us not confine ourselves to the study of dental literature entirely, or works of a scientific nature, but also surround ourselves with books of general literary interest; not, however, as did Peter, czar of Russia, with the big volumes at the bottom and the little ones at the top, upon which the accumulating layers of dust marked the passing years, but with books chosen as you would a friend—books of history, that you may learn to read the future by the lessons of the past; books of poetry, the great epics, dramas, and lyrics, for inspirational value; and the literature of the essay, Bacon's, DeQuincey's, Burke's, Descartes', Spinoza's, and our own Emerson's. Never fear, there is no danger of knowing too much! Something, indeed, has been said about the spark of genius being smothered by too much learning, yet that can be but error, for experience shows that knowledge is the fuel of genius and that no blaze could be made without it in some form. Every genius has knowledge—to be a genius means that one has studied more than his fellows—not necessarily books altogether, but good, constant,

honest, hard thought given to the thing in hand. Everyone who has a normal mind can become a genius by the same process, but right there comes the difficulty: Every mind seems to naturally adopt the views of others. It is so much easier, so much less trouble, in fact, to fall into the habit of doing and thinking as others do. The genius gets above this. He studies and thinks for himself about some particular thing. He gathers information from every quarter possible, and learns from experience and observation and the failures of others, and finally the solution comes to him, not by accident, not by intuition, but as the natural result of his diligent, honest, untrammelled thought and labors. Merely to know books, then, or to fill the mind with their contents, is not the object in view; but rather to use them to get at the best that is known and thought, which in turn gives to the student inspirational form for the expression of his thoughts and ideals in clear, convincing English.

Would that every member of the dental profession would get this working knowledge of literature and books. Then no longer would the general practitioner be simply an operator of ability, but he would become the scientific and literary exponent of his calling, capacitated to do something toward enriching the human mind, really adding to its treasure—perhaps be enabled to take a step farther and discover some unequivocal truth in a region where it seemed that all was known and explored, and being prepared to produce this thought, observation, or invention in some form great, large, acute, reasonable in itself, could thus speak to his profession, to the world, in a style that is all his own, yet a style that finds itself the contemporary of all ages. Take such a man as the type of the individual practitioners of dentistry, advancing as an organized body the world over, and you will get the twentieth century ideal of professional progress measuring up to the world standard, and revealing itself in a literature that is at once both permanent and universal.

WHEREIN CLINICAL EVIDENCE IS AT VARIANCE WITH EXTENSION FOR PREVENTION.

By **P. B. McCULLOUGH, D.D.S., Philadelphia.**

(Read before the Susquehanna Valley (Pa.) Dental Society, May 18, 1909.)

THE time of greatest susceptibility to caries in the average subject is during the period between childhood and puberty.

The absence of scientific data explaining why, with the presence of the destructive microbes at all periods in the mouth, caries is not always active, permits the reasonable though empirical explanation of lowered vital resistance due to the increased demand on the nutritional supply while this important physiological change is taking place. As the histological and chemical evidence tends to prove that the difference in composition of the teeth has no bearing on their ability to resist decay, the only other ground for the above statement would seem to be the effect which this state of disturbed nutritional equilibrium would have in modifying the oral secretions to the extent of their becoming media favorable to the development of the destructive bacteria.

It is the purpose of this paper to discourage radical technical procedures, from the belief that the technique of cavity preparation cannot be said to be scientific until the problems involved in the cause of caries in one case and its absence in another are better understood.

As the susceptibility or immunity of the teeth to decay is not due to any difference in structure, but to causes external to the teeth, it follows that a filling having no control over the forces responsible for caries must be an indifferent remedy during a period of continued activity of the disintegrating elements.

A review of the histological investi-

gations of the pulp by Miller, Latham, Talbot, Black, Broomell, and Andrews, together with a number of others, cannot fail to impress one with the delicacy as well as with the importance of this organ. A thought reflected by Dr. Latham in her statement in the *International Dental Journal*, vol. xxii, page 612, is: "One noteworthy point is the constant effort directed to the 'killing of the pulp' by every known means, and the very little encouragement to try to save the 'formative organ.'"

To quote from Andrews, *International Dental Journal*, vol. xxv, page 759: "The pulp fibrils are as much a part of the pulp as any portion of it, and are the channels by which its vital functions are carried on. . . . Each canal contains a fiber bathed in a fluid, and this fiber is an arm of the pulp. Branches from this fiber anastomose with others through the dentin matrix. They form a delicate network in the substance of the crown near the enamel. . . . The function of the pulp is not only to vitalize, but it may again assume its formative function whenever causes for repair demand this action."

Exceptional instances of this latter function are illustrated by Miller in the *DENTAL COSMOS*, vol. xliii, page 853, and in the *International Dental Journal*, vol. xxiv, page 649. With this last-named paper appear two photomicrographs, one showing a diseased pulp horn isolated by secondary dentin, and the other the isolation of an abscess of the pulp by a thin wall of calcific deposit.

The upper bicuspid, because of their form, are structurally the most delicate

and as a rule are the first to be lost; therefore the phases through which these teeth only too often and too early are seen to pass in their retrograde change through life teach a lesson. The history of any one of them may be stated as beginning at the time of youth with an approximal cavity backed by a healthy pulp active in building a protective barrier opposite the point of invasion. The operator breaks in the marginal ridge, extends the cavity occlusally, gingivally, buccally, and palatally, exposing with accompanying irritation and pain the pulp fibrils, and packs a metal filling, the antithesis in conductivity to the insulating structure removed, and the pulp suffers its first shock from an artificial irritant.

Years pass, when the filling is judiciously removed to relieve a putrescent pulp and to fill the canals aseptically. The cavity margins have already been extended to the "excursion line"; they need only to be shaved. A second filling is inserted, but without the step, and the second phase in the retrograde change is recorded. An accident enters next, and the buccal wall gives way. To preserve the palatal wall, a shell crown becomes the remedy, inviting fermentation at the gingival margin, until recurring pericemental necrosis and the forceps end the story.

Cases without number are in constant evidence in which gold fillings have been inserted in patients of from twelve to eighteen years, with resultant fistulæ appearing later in life, the operation speeding the devitalization, which often would have been delayed if no filling at all had been inserted.

When the average period of comparative immunity following puberty is considered, how much better this retrospect would be if the teeth had not received the radical operative interference characterized in the above brief summary.

Considerations involving filling as a remedy should include the preservation of the pulp and the maximum strength of the tooth, both of which are obtained by economy of structure, the operator being mindful of the approach of that

time in life when caries is least to be feared and the last stand is made to protect the soft tissues until atrophy destroys the last physiologic support to the peridental membrane.

A knowledge of the histological relation of the enamel rods is important for the intelligent understanding of the character of structure worked upon; this knowledge, however, cannot with reasonable practicability govern the character lines of cavity formation or marginal bevels.

If the interprismatic cementing substance were more or less resistant than the rods, the accidental fracture of enamel would show surfaces following rod alignment; yet the characteristic angular fracture shows the direction of the application of the force bisecting the rods and the cementing substance exactly as if the rods and cement were one histological homogeneous structure.

Dr. Walkhoff, disclaiming Williams' idea of the cement substance, says that the rods are actually in contact. (*International Dental Journal*, vol. xxiii, page 719.)

A beveled margin, as such, no more resists chemical action than does a square margin. Brittle substances like enamel are sensitive to mechanical injury from blows of the percussion type, such bodies resisting much greater force when gradually applied. The axial* margins of a filled cavity are not exposed to this sudden impact as may be the occlusal surface.

No filling material has at its square edge the edge strength of the square edge of enamel. The beveling of enamel margins for protection is illogical when the weaker body is to provide the protection. If beveling for protection is necessary for gold, then square enamel margins should fail with amalgam, offering less protection, and still more with inlays offering no protection, when after a few weeks the cement at the surface disappears.

Any technical method of procedure is

* "Axial" is used to denote the buccal and palatal walls of a cavity.

objectionable in proportion as it is difficult of execution, for the reason that average skill is below the requirements. This truth seems to be recognized by the exemplars of dental manipulation, as instanced by the fact that, when the carious surface of a tooth is given for a clinic, that surface usually happens to be the mesial—for against the beveled walls of a cavity so situated it is so much easier to pack gold.

Forming the gingival wall on a horizontal plane offers no advantage either as a means for prevention or as a base for seating a filling.

The area of greatest susceptibility to recurrent caries is at the gingival margin; whether the line of cavity formation at this margin be straight or curved can serve no purpose as a means for prevention.

A flat gingival wall becomes a seat according to its internal formation, and together with the axial walls; a curved cervical wall becomes a seat according to its internal formation and together with the axial walls, so that when the axial walls are involved in filling, the plug is secure against rocking. This fact is equally patent whether the base be flat or curved.

Because of the considerable difference in mesio-distal measurement between points at approximal contact and corresponding points at the neck of a bicuspid, when the axial cavity walls are made parallel and join the flat base at an angle, because of the surface slant of this tooth, packing against these walls is made more difficult, while the tendency to "slide off" is increased by the bevel. On the other hand, if the curved gingival margin be made continuous with the axial walls, and conforming to the ocluso-gingival surface convergence, the axio-gingival curve is much easier packed against, and the tendency to "slide off" is materially lessened.

It has been said that the anchorage must conform to the extent of filling surface exposed to stress. In conformity with this a small approximo-occlusal cavity must be extended on the occlusal surface, forming a step, thereby increas-

ing the surface exposed to stress; therefore increase the surface of anchorage. As cavities of decay present, difficulty in conforming to the above rule will be found, in that when the extent of decay is so slight that ample dentin remains to form a step it is not necessary, and when the extent of decay is such as to make desirable the step, no dentin remains to make it in. By dividing the bond of union between the cusps of the weakest tooth and substituting a malleable material, the danger of splitting is increased.

The area of immunity to decay is that part of the margins of a cavity not decayed.

The extension of these cavities to involve the angles—which are surfaces less prone to decay—is based upon the assumption that surfaces not decayed will decay if not cut out at the time of filling; and as assumption is not science, this leaves science in the background and leads into the realm of the problematic.

Evidence to dispute the accuracy of such reasoning is seen where there has been no recurrence of decay around imperfectly packed gold in approximal cavities with their margins in contact. Again do we see it in the uninjured surface of one tooth enveloped by a cavity in its neighbor—a condition most favorable to decalcification—showing either that the sound tooth is less susceptible, or that the forces responsible for decay active on the surface of one tooth had suspended their operation before the other became involved.

To claim the right to extend an original cavity because other fillings failed in like cavities not so extended is unjustifiable without a knowledge of the other possible contributory causes to such failures.

It is further stated that the lateral extension of these walls is to bring the margins within the path of the excursions of food, so that they may be cleaned by friction in the act of mastication. This, to be complete, would require that some other force or agent be utilized to similarly protect the gingival margin between the axio-cervical angles.

Curved margins are more graceful than angles. Curved walls are more con-

servative of strength than angles. Shallow grooves are more conservative of structure than are angles.

There is greater danger of impairment of pulp function with the angular type of cavity preparation.

The character lines on which a cavity is prepared, and the skill with which gold is inserted, are the least of the factors preventing recurrent decay.

In a work by Robert Arthur, Philadelphia, 1871, recommending the simple removal of the carious area and polishing the remaining exposed surfaces, without other treatment, the author is most positive that by this method he could stay the progress of caries. He quotes a letter from Dr. W. H. H. Thackston, stating in part: "I frequently meet with pearly soft teeth that I filed freely twenty and twenty-five years ago, sound and good, with texture hardened by time and the change that occurs in all dental and osseous tissue as we advance in age; with surfaces shining and lustrous as if some natural polishing forces had been going on in the mouth during the interval. On the other hand, I have to deplore the comparative failure of some of the most perfect and beautiful fillings that cost me hours and days of patient, painstaking labor. . . . Dr. Eleazar Parmly of New York paid one such of my cases the compliment of saying it presented the most perfect specimens of proximate filling he had ever seen. And yet, although the patient was an attentive and appreciative one, who was fully instructed and spared no pains in the care of her teeth, decay, after a few years, commenced around the edges of the fillings."

In the paper by Dr. Miller, before referred to (*International Dental Journal*, vol. xxiv, page 650), we read: "In the second case [there illustrated] we have a lower molar in which the enamel has been completely destroyed by decay and the dentin decalcified nearly or quite to the pulp. The caries, for some reason, stopped at this stage and the decalcified dentin became hard and black. In other words, it is a case of self-healing of the dentin. Strangely enough, we

find a self-reparative process going on in the pulp at the same time."

Three general clinical factors governing in diagnosing conditions of caries, with relation to treatment, in the average patient between childhood and puberty are:

- (1) The general nutritional state.
- (2) (a) Commencing period of decay; (b) active period of decay; (c) declining or past period of decay.
- (3) State of suspension of activity of elements responsible for decay, as indicated by changed appearance in tooth structure.

The following are cases from practice as treated in conformity with, and in disregard to, the above plan:

Case I. A girl, age fourteen, with good general health and mental and physical attributes of complete puberty. A period of decay was regarded as passed, there being a number of occlusal and approximo-occlusal cavities, several of such extent of caries as to require both gutta-percha and cement intermediates. All cavities were filled with gold. All teeth were present and vital. After six years no other work has been done.

Case II. A first cousin of case I; age twelve, with good general health and the mental and physical signs of girlhood. Here was a commencing period of decay. All of a number of small cavities were filled with gutta-percha. During a period of seven years the work has consisted in the occasional renewal of the gutta-percha without extension of the original cavities, and the occasional filling of a new cavity. (All these cavities will be filled with gold, not inlays, at the proper time.)

Case III. This is an exception to the general rule, the case being that of a married woman of poor nutritional state who apparently has never been free from susceptibility to caries. Nearly all the molars were lost, and only the roots of five of the upper front teeth remained when the writer was consulted. One upper bicuspid was conspicuous among all the remaining teeth as having the appearance of a superior organic matrix. The mesio-occlusal cavity was filled with gold, which is unchanged after six years. All the other teeth have been treated palliatively, except the anterior roots, which were crowned. No teeth have been lost, no pulps destroyed, nor has any change taken place during this period, indicating metal fillings.

Case IV. A girl of ten years, with a small occlusal cavity in each of the lower first molars. The conditions were as near alike as it is possible to imagine. One was filled with gold, the other with gutta-percha. The cavities were prepared alike. The gold filling failed within two years, owing to recurrent caries; the gutta-percha filling, except for its being a little worn, was intact, as were the cavity margins.

Case V. A girl of fourteen years. Though the patient was not sickly, her nutritional status was not good. She presented the active period of decay. The mesio-occlusal cavity of an upper bicuspid was filled with gold. The filling failed within two years owing to recurrent caries.

It seems to be the rule that most filling for initial decay is done during the period of usually greatest susceptibility before puberty, and that most dental work after that, if the teeth remain, consists in refilling the original cavities after failure of the fillings, or in the necessary removal of these fillings for the treatment of putrescent pulps which died

under or were killed by the fillings. The fact that so much work is usually done during this period explains the impression reflected by the laity in the common though significant statement: "My teeth are soft; fillings do not last." It is the character of the treatment which the teeth receive during this period that is chiefly responsible for the death of the pulp and its chain of consequences.

As before stated, as the formation of a cavity or a filling can have no control over agencies external to the tooth that are responsible for decay, "extension for prevention" becomes a negative remedy.

As the character of approach to a simple approximal cavity from the buccal aspect will not permit either of the best possible preparation or the best packing of gold for adequate support to the marginal ridge, it follows that the marginal ridge should be removed; to this end therefore, from a purely mechanical standpoint, *extension for access only* becomes a definite requirement.

THE ELIMINATION OF FEAR IN THE PRACTICE OF DENTISTRY.

By W. T. JACKMAN, D.D.S., Cleveland, Ohio.

(Read before Section II of the National Dental Association, at the annual meeting, Birmingham, Ala., March 30, 1909.)

THE bane of human existence is fear. The rich live in fear of losing their wealth; the poor are ever anxious about food and clothing and shelter. If well, many people live in constant dread of becoming ill; if ill, they are fearful that health may never again be theirs to enjoy. Fear is just as real to the patient though wholly imaginary, as it is when caused by a previous experience. People with very sensitive teeth are filled with horror when informed that operative procedure is necessary because of the ravages of dental caries. Many never

return to the dentist after the first visit—they would rather lose their teeth than endure the pain. It is with these that we are concerned in particular; yet the humane operator is always unwilling to give anyone pain when it can be prevented. Let us now study ways and means whereby we may eliminate this fear of dental operations.

The title of this paper implies that more humane methods should be employed in our efforts to cure or repair dental and oral lesions, particularly the former. I state the truth when I say

that *nearly* all pain inflicted by dentists could be wholly averted if proper and available means were used. This sentence is susceptible of demonstration, therefore is scientific. We have come to the time when cavity preparation may, with only an occasional exception, be made without pain. It would be next to criminal for me to use a bur in a sensitive cavity. This I say after almost five years of practical experience demonstrating the fact that cavity preparation may be made without fear of pain on the part of the patient. Is this not worth striving for?

Ever since dental operations have been made it has been the study of the best operators to find some way whereby pain might be lessened or eliminated. Other things being equal, are we not or should we not be more interested in this vital question than our predecessors? I am sure that no negative reply will be given to this interrogatory. Then, as we study the prevention of pain, let us first remember that no one ever seeks the professional services of the dentist except as dire necessity drives him to it. How necessary, then, to treat him kindly, gently, humanely. It is understood that the patient will find the office of the progressive, up-to-date dentist neat, tidy, and clean—particularly should this be true of the operating room—with nearly all instruments out of sight.

This leads to one point which I wish to emphasize in particular; it is this: In order that the patient may be at ease while the operation is being performed, there should be fastened to the head-rest a downy feather pillow, size $2\frac{1}{2}$ x 10 x 12 inches, for the patient to rest the head against. The padding of the ordinary head-rest is so hard that it becomes torture for the patient before the end of a two hours' sitting.

Let us now familiarize ourselves with some method or methods whereby we can put our patient at ease and keep her there during the entire visit.

Lest this paper should grow too long, I shall discuss but three phases, viz: First, putting the patient at ease after taking the operating chair; second, the

adjustment of the rubber dam, and third, desensitizing the tooth for cavity preparation and pulp removal.

If the dentist concludes that he has a right to hurt his patient in order that a good, saving operation may be made, he is in serious error.

Humanitarian dentistry means, practically, painless dentistry. I do not propose to discuss dental histology, but simply refer to the odontoblastic layer of cells, with their prolongations extending throughout the length of the dentinal tubuli, being the protoplasmic contents of the tubuli, the fibers of Tomes, etc.—and in this connection I wish to remind you that there is sensation from the enamel ends of these tubuli throughout their length to the pulp, and thence to the nerve centers at the base of the brain—but I do wish to discuss with you the fact that just in proportion as we inhibit or prevent painful sensations from reaching the nerve centers we eliminate the dread or fear of dental operations.

In doing this latter, however, the careful operator is always mindful of a possible resultant pathological condition. He consequently makes his clinical tests cautiously, weighing every detail, and from this data forms his conclusions relative to the merit or demerit of any method of practice.

After your patient is seated in the operating chair, proceed at once to allay her fears by assuring her that you will not hurt her. Do not stop here, however, for the chances are that she will not believe you, unless you explain just what you intend to do that she may not be hurt. Having gained her confidence in part, make the operation as promised, and you will ever after have her singing your praises. Now, do not misunderstand me, for I would not lead you to think that one may become so efficient in painless methods as to never cause pain, but what I would emphasize is that more than ninety per cent. of our work may be done without pain, and when pain is inflicted it should be but slight indeed.

In learning to eliminate fear in the practice of dentistry the passing of time

must not be considered, for one must have the all-absorbing thought in mind that the patient must not be hurt; then following this the perfect operation can be made, because the conditions make it possible.

It was first discovered that dehydrating the dentin by the use of warm air was a means of no little value in preventing pain; yet in many cases, even though the attempt be skilfully made, it is found to be more painful than the preparation of the cavity after drying with absorbent cotton only. This method, then, has proved to be of uncertain value as a desensitizer.

Next, medication by way of topical application has been much used, and is still being used with considerable success. The chief objection to drugs used topically is their superficial effect—they do not obtund deeply enough, often-times, to permit of the removal of a single layer of leathery dentin without giving pain. While warm drugs topically applied have much merit as obtunders, yet they fall far short of the ideal. Following the topical use of drugs came the freezing or cold mixtures. The Van Wyck-Kerr obtunder is probably the best of these. The mixture used is sulfuric ether, with a small addition (5 per cent.) of alcohol. The effect is produced by a small spray of this mixture—operated by compressed air, from fifteen to twenty pounds—being thrown into the cavity, after first placing several layers of cotton over the cavity and throwing the spray on the cotton for a few minutes, then removing the first layer of cotton, and thus gradually removing all the cotton, when the spray is thrown directly into the cavity. This method will obtund, but it has several serious drawbacks. The cavity must be prepared while the spray is being thrown in, for if the spray is removed, sensation will return in about a minute. In preparing a cavity while it is wet the operator is prevented from following the fine lines of decay to their end. Then, again, the smell of the ether is offensive, and lastly, the apparatus is quite expensive. Theoretically, at least, it would seem to

produce a condition of the pulp not conducive to its continued health; yet Dr. E. T. Loeffler of Ann Arbor, Mich., tells me that after more than a year's use he has not noted any ill results to the pulp; but this time would seem too short for definite clinical conclusions. There are other cold sprays, such as ethyl chlorid, etc., all involving practically the same objections.

After these came cataphoresis. What a furor this method of procedure created for a time in the dental profession! But this, like many other things which at first gave great promise as obtundents, proved to be inefficient to a very great degree, largely because of the crude apparatus that was available.

My *confrère* and fellow townsman, Dr. Weston A. Price, invented a cataphoric machine that would obtund—the only efficient cataphoric apparatus that was ever put on the market as far as I know. When this was properly used in connection with the milammeter it would do the work; but even the good doctor's apparatus was defective. Although, as stated, it would obtund, this defect proved fatal to its general adoption, viz, too much time was required to obtund, and added to this was the difficulty of properly insulating the tooth to be operated upon.

After the above brief description of what we had in the way of desensitizers up to five years ago, I come to you today with a thing which is not new nor is it old—it is of the tender age of five years; a method that has been of inestimable value to me, and should be to every dentist; a means for obtunding sensitive dentin of which if I were to be deprived I should want to cease the practice of dentistry. I refer to anesthesia produced by a two per cent. aqueous solution of cocain hydrochlorid with the use of the high-pressure syringe. Few dentists, apparently, have had the patience and determination to master this instrument, but when this mastery is once acquired there is no instrument in the dentist's armamentarium of so much value as this, the *proper* use of which will turn your patient's mourning into joy

and will relieve you from much nervous strain—consequently you will be less tired at the day's end. It will enable you to operate more expeditiously and perfectly, especially with nervous patients.

This paper is intended to be helpful more particularly from the practical side; therefore I shall endeavor to describe to you in simple terms the procedure that will produce the desired results, viz, the complete obtunding of the tooth, in order that cavity preparation may be made painlessly. Let me say by way of parenthesis that there are many high-pressure instruments on the market, but there are, as far as I know, but two or three that are really efficient.

Let us select, if you please, the typical nervous patient with the blue white teeth that are always sensitive. She comes to the office with fear depicted on every feature, and often we note the tremor of the whole body because of the never-to-be-forgotten previous operation or operations; or perchance it may be her first visit to the office, but fear controls her because she has heard others relate their experience. Let us prepare a cavity or cavities for this young woman of sixteen or eighteen summers. As previously stated, her fears must be allayed, as far as possible, by assuring her that you will not hurt her. After this proceed to adjust the rubber dam, if the teeth and gums do not need prophylactic treatment. Before adjusting the dam, however, a very important procedure should never be neglected, viz, desensitizing the gums with a five per cent. aqueous solution of cocaine hydrochlorid. This should be applied for at least five minutes, by grasping a piece of cotton with the pliers, dipping it in the solution and saturating the gum margin, using considerable pressure around the teeth over which the dam is to be placed. Then adjust the dam and proceed as follows, if the tooth to be operated on is a lower right first molar containing a large occlusal and a medium-sized buccal cavity: With a No. 3 round bur make a slight pit in the enamel, over healthy dentin, one-third the depth of the enamel; this pit should

be made on either side of the buccal cavity or preferably just below the buccal cavity, if possible. Then use a No. $\frac{1}{2}$ round bur to slightly deepen the pit already made, but do not drill through the enamel, for this would give needless pain. By running the engine at low speed the operation so far has been without pain. The tooth is now ready for the high-pressure syringe. The syringe I use has forceps handles with a locking device between the handles so that when complete contact is established in the pit with the point of the syringe and the handles closed as far as possible, they remain locked, thus relieving the hand and preventing cramp. Previous to applying the syringe, fill it with a two per cent. aqueous solution of cocaine hydrochlorid by placing the point in the solution and opening the handles; this will fill the barrel. Then grasp the handles, dagger fashion, stand behind and to the right of the patient, pass the left arm around the patient's head, place the second, third, and fourth fingers of the left hand under the patient's mandible near the chin with the index finger of the left hand against the tooth to be operated on, for counter pressure. Pass the barrel and point of the syringe, after filling, through the flame of the alcohol lamp to warm the solution. Then place the point of the syringe in the previously prepared pit, press slightly, then close on the handles; if perfect contact be made, the handles cannot be closed far. Remember that perfect contact is not always possible, but the tooth is being obtunded, as to rapidity, just in proportion as the contact is relatively perfect.

We have now come to a point in the operation when the utmost care must be taken, for, with tremendous pressure, water with cocaine in solution is being forced into a live tooth. At this point some definite rule must be followed to be successful—no haphazard guesswork will do. The rule is to count by seconds. This knowledge is readily acquired by the study of the swing of the pendulum of a time-regulator; exercise this knowledge in using the syringe. On making the first application thirty seconds are

usually required, when perfect contact is obtained, to force the solution through the remaining third of the enamel and a little way into the dentin, which may now be entered with the No. $\frac{1}{2}$ round bur without giving the slightest pain. Then drill through the enamel with the No. 3 round bur. This is done in order that the continued pressure of the syringe may not craze the enamel. In a patient of this age and temperament continue the pressure for one and a half minutes longer, or ninety counts. If there has been perfect contact of the syringe in the pit, or, in other words, if there has been no leakage and the pressure caused by closing the handles has been as great as possible, the pulp will probably have been sufficiently obtunded so that the cavities may be prepared without pain. If, however, there is any sensation, use the syringe a few counts longer, but be very careful not to over-use it. Here is where the careful operator will succeed and continue to succeed, and conversely, the careless operator will fail and continue to fail until in disgust he will conclude that the method is a failure, never dreaming that he, and not the method, is causing the failure.

Let us not forget that even if nothing but water be used in the syringe, it is not difficult to force enough into the pulp chamber in a comparatively short time to strangle the pulp by pressure and thereby cause its death. But our obtunding solution is water plus cocain. Cocain is said to be a protoplasmic poison.* This is true when a high percentage is used. Several articles have appeared in our dental journals in the last four years against the use of cocain by the high-

pressure method, because, the claim is made, cocain is a protoplasmic poison. So is strychnin a protoplasmic poison when given in overdose. What would the neurologist do in certain forms of neurosis if he did not have strychnin to depend upon as the sheet-anchor? To be sure, he does not give it in poisonous doses, but when given in 1/120 to 1/60 gr. doses it becomes a nerve tonic rather than a poison. I cannot say that a cocain solution of a strength of two per cent. or less acts as a true tonic when forced into the pulp, and here the analogy fails, but I do claim, after almost five years' clinical test, that I have no proof that it acts destructively on the pulp tissue, but on the contrary, I am sure that I have observed fewer cases of necrosis of the pulp in the last five years under anesthesia produced by high pressure than in any previous five years. There are, I believe, two reasons for this: First, when the pulp is anesthetized it receives no "shock" from cavity preparation—but notice, please, that if great care be not used it may be injured by heat generated by running the engine too rapidly while cutting with the bur, particularly if the bur is not removed frequently, although, at the time, the pulp does not respond. Second, it receives little or no "shock" from malleting, for as a rule it does not recover fully until after the operation has been completed.

Reverting to procedure, someone may ask, Do you always get perfect contact in applying the point of the syringe to the pit? In quite a large percentage of cases I do not, yet if we get some pressure, in that proportion, as previously stated, we are accomplishing the work. Some patients are fidgety, and in working on the mandible it is often difficult to get perfect adaptation because of its instability. When one becomes accustomed to the use of the instrument the securing of contact, although it is the most difficult part of the operation, becomes comparatively easy.

For the removal of pulps, use the instrument half as long again as for cavity preparation. This rule must of necessity be a very general one, for the condition

* "Cocain is a strong protoplasmic poison, paralyzing all cells with which it is placed in contact. . . . Local application paralyzes nerve cells, fibers, and endings. Sensory nerves are the most sensitive, so that cocain acts as a local anesthetic. . . . It produces a local vaso-constriction at the place of application. . . . On systemic administration it causes an irregular, but on the whole a descending, stimulation and paralysis of the entire central nervous system."—Sollmann's "Pharmacology," 1906, p. 212.

of the pulp is always a factor in determining the length of time the syringe should be used. The greater the congestion of the pulp the longer the time required. If congestion has reached the stage of stasis it is impossible to anesthetize by this or any other method. Do you always succeed in obtunding with the high-pressure syringe? This is a pertinent question. The answer is, Yes, and no. I never expect failure and rarely do fail; but occasionally we find a tooth with curly dentin; in such a case, if the pulp cannot be reached at one angle, it may oftentimes be reached from another. Occasionally we find the teeth of an aged person to be very sensitive. Such teeth are usually difficult to obtund, because the dentinal tubuli are almost obliterated. These two classes are the only ones I ever have any trouble with, when the pulp is in a healthy condition.

These, then, are three advance steps taken in the elimination of fear: First, in the adjustment of the rubber dam; second, in cavity preparation, and third, in pulp removal—three of the most painful operations in dentistry, if made in the old way.

You will have noted that I have presented this plea for a more humane practice of dentistry without superfluous technical verbiage, circumlocution, or rhetorical flourish. It has been stated in plain, simple language so that all who hear and read may understand, and with the one thought in mind that *means are available* for practically painless dentistry.

In conclusion, if you would succeed with the high-pressure syringe, carefully observe the following rules:

First: Never use it in a carious cavity, mainly for two reasons—because (a) the mouths of the dentinal tubuli are filled with débris, therefore you will not be likely to succeed, and (b) if you do succeed in desensitizing the pulp you will probably force ptomaines into it which will be almost sure to cause its death later. If it does not die, it will probably give the patient trouble for which the cocain will get the blame.

Second: Always enter the tooth from some surface point, for by so doing you will have a definite idea as to the relative distance to the pulp. This knowledge is imperatively requisite, for when you recall the case of my patient here you will remember that much more time is required to get the desired result than if you were entering a lower incisor at the gingival line.

Third: Age and temperament must be carefully considered, particularly as to the time required for desensitizing. We know that the dentinal tubuli and pulp in young patients are much larger than in aged ones, therefore much less time is required to obtund their teeth. This is particularly true of the nervous and bilious temperaments as compared with the sanguine and lymphatic. The danger of injuring the pulp by the use of cocain, as suggested above, is so remote that the ultra-conservatism which prevents its use spells injustice to the patient.

If after presenting this paper and demonstrating its teaching I shall have convinced you, or any of you, that fear of dental operations can and should be eliminated, the paper and demonstration will have filled their mission.

CORRESPONDENCE.

THE BARRING OF THE D.D.S. IN ITALY.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—As president of the Federazione Stomatologica Italiana I consider it my duty to correct some assertions made in a letter of Dr. De Vecchis and published in the June issue of the DENTAL COSMOS, at page 712.

The act of 1890 has always stood as law, and will stand until it is recalled, which we hope will be never. The present movement tends more to confirm that law than to give it a new interpretation. For nineteen years no one in Italy has been allowed to practice dentistry without having previously acquired the M.D.

degree. The barring of the American D.D.S. is not a new menace, but simply a rule to which Italians as well as foreigners have to conform. It is therefore wrong to speak of faulty international reciprocity. In regard to the lack of dental schools in Italy, I ask Dr. De Vecchis to read the two communications of Dr. Talbot, published in the DENTAL COSMOS for March and April 1909.

With many thanks and kind regards,
I am

Yours sincerely,
PROF. DR. CAMILLO ROVIDA.
MILAN, ITALY.

PROCEEDINGS OF SOCIETIES.

DENTAL SOCIETY OF THE STATE OF NEW YORK.

Forty-first Annual Meeting.

FIRST DAY—*Morning Session.*

THE forty-first annual meeting of the Dental Society of the State of New York was held in the Odd Fellows' Hall, Albany, May 6, 7, and 8, 1909.

The meeting was called to order by the president, Dr. Louis Meisburger, Buffalo, at 8 o'clock on the evening of the first day, Thursday, May 6th, and was opened with prayer by Rev. Joseph Addison Jones, Albany.

The reading of the minutes of the last meeting was dispensed with, on motion,

on account of their presentation in the printed Transactions.

Dr. BURKHART, chairman of the Business Committee, suggested that Dr. Ottolengui be given time to make the report of the Miller Memorial Committee.

REPORT OF THE MILLER MEMORIAL COMMITTEE.

Dr. OTTOLENGUI submitted as the report of the committee a communication from Dr. Brophy, chairman of the National Committee, as follows:

April 16, 1909.

Dr. L. MEISBURGER, Albany, N. Y.

Dear Sir,—As president you are requested to bring the matter of the creation of a perpetual memorial to Prof. Dr. Willoughby Dayton Miller before your society at its next regular meeting, and appoint sub-committees, or take any other action which will enlist the interest of the members and induce them to subscribe as generally and liberally to the fund as possible. We desire from you a reply to this communication, that the American representative of this movement may be informed as to what dental societies in America are willing to co-operate. We hope also that you will kindly suggest what form the memorial should take, thus assisting the International Dental Federation in reaching a decision. We desire to make as large a showing as possible before the time of the meeting of the Federation in Brussels, August next, so that the probable contributions from America will be known at that time. We believe that America will take a leading part in this movement, as she has in all other matters of interest to the dental profession.

"At the meeting of the International Dental Federation held last August in Amsterdam, a committee was appointed for the purpose of taking under consideration the question of a perpetual memorial to Professor Dr. Willoughby Dayton Miller, the recently deceased president of the International Dental Federation, and to report at the next meeting at Brussels in 1908 a plan for putting this purpose into practical effect. This committee appointed by the I. D. F. consists of the following gentlemen: Dr. Carl Röse, *chairman*, Dresden, Germany. Dr. N. S. Jenkins, *secretary*, Paris, France. Dr. Florestan Aguilar, Madrid, Spain. Dr. Truman W. Brophy, Chicago, U. S. A. Dr. Ch. Godon, Paris, France. Dr. John E. Grevers, Amsterdam, Holland. Dr. J. H. Mummery, London, England.

"The object for which this committee has been formed is one which will beyond doubt meet with the sympathetic approval and active co-operation of a large body of dental practitioners throughout the world. The work of Miller places him among the list of the benefactors of the human race and among the very few who have been benefactors of dentistry. It is therefore peculiarly fitting that the proposition to create a perpetual memorial of him has at once been given an international character by emanating from our representative international body.

"It has been truly said: A part of the debt

of gratitude we all owe Dr. Miller is his part in the benefaction to the human race in having wrought out the details of a problem which had engaged the attention of thoughtful men for centuries, having taken up the work at a time when the errors of existing theories as to the cause of dental decay were giving a semblance of justification to methods of practice that were causing the ruin of countless thousands of human teeth, in having arrested this tide of destruction and having furnished the data which ultimately directed the work of saving human teeth into correct channels of procedure.

"When we contemplate the number of his contributions bearing upon the question of dental caries alone, not less than forty-five including his treatise on micro-organisms of the human mouth, and when we take into consideration the fact that practically all of this literature is the published record of long researches carried out with infinite care and patience, we might justly conclude that such an exhibit is an honor great enough for any one man to have achieved in our profession. But such was the versatility and activity of his mind and so great his capacity for sustained mental effort that his work on the caries question was but a minor part of his total output of research work. His study of dental caries was but one department of the larger field of oral pathology which absorbed his attention; his investigations of the pathogenic fungi of the human mouth-cavity have enriched our knowledge of oral diseases and their systemic relations to such an extent as to have really added a new department to the art and science of healing, and given to dentistry a dignity and importance which it previously lacked in public estimation. His clear expositions of the importance of the human mouth as a focus of infection have exerted a modifying influence upon medical practice by directing attention to the dangers which arise from that source of disease causation, and in a similar way they have improved certain phases of surgical procedure for the same general reasons. The work of Miller in the study of antiseptic and germicidal agents for combating the activities of bacteria in the mouth and their effect upon its tissues are classics which enable us to select and use these agents in a rational and scientific manner. His studies of filling materials in the physical, chemical, and utilitarian relations cover investigations of gold, gold and tin, amalgam, cements, porcelain, and copper amalgam.

"Over one hundred and fifty formal theses represent the published results of the work

of this master mind. The surpassing importance of Miller's work and its direct influence upon our professional activities is not so generally recognized as it should be. His was the master mind that continuously wrought out results in the eternal struggle with ignorance and error. His immediate influence was exerted upon a limited minority who kept in touch with his activities, yet his teachings expanded in ever-widening spheres of influence as they were transmitted in various ways to the profession at large. He created a new and growing interest in scientific results that was almost an unknown quantity in dentistry before his time. This fact is evident in our literature now as it never was before. It is further interesting to note that much of the new work in scientific dentistry owes its origin both as to initial idea and present possibility to the stimulus of the pioneer work of Miller. He has left us a rich legacy in the record of his work.

"The committee of the International Dental Federation has undertaken to raise a sum of money, the income from which shall be awarded by a committee to be appointed at Brussels, August 1908, at stated periods, for scientific work of the most distinguished merit in dentistry. The movement is international in its scope. There has been subscribed at the present time in Germany for that purpose alone, 13,000 marks. We hope and trust that America will not be second to any other nation in the material expression of gratitude to the memory of this great leader.

"The splendid example which Professor Miller has given us of unswerving loyalty to his professional ideal, of unremitting labor for the cause of truth, of high scientific attainment as the natural and logical result of such effort when undertaken and carried on in the spirit of unselfish love for and devotion to our profession's interests is the best answer that any man can give to the question so frequently asked by weaker minds, What use is it? It was Miller's answer in results that has uplifted his profession. It was the example which he gave us of a life consecrated to the good of his kind that places him first in our list of immortals."

Dr. Miller was a native American, and the first one that was ever honored by a full professorship in a German university. While Miller was claimed by Germany and claimed by the United States of America, his fame is the profession's glory, and in remembrance of his remarkable career and his professional renown let us subscribe to the fund and assist in stimulating scientific research and emulate his praiseworthy example.

After consultation with members of the profession in the larger cities of our country, it has been decided that in order to facilitate the collection of funds, the president and secretary of the various state and local societies of the United States be requested to act as committees for the purpose of securing subscriptions.

I have secured the services of Dr. Rudolph Beck of Chicago to assist me in the work of raising funds, and to act as my secretary.

Subscriptions should be sent to Dr. Truman W. Brophy, 6 Madison st., Chicago.

Very truly yours,

TRUMAN W. BROPHY.

April 16, 1909.

Dr. L. MEISBURGER, Albany, N. Y.

Dear Sir,—To the accompanying letter, addressed to you as president of your society, I wish to add my personal solicitation of your aid in raising the necessary funds to insure a fitting memorial to Dr. Miller.

I feel that we should look upon it in the light of our privilege and pleasure to give liberally the financial aid asked, as well as our best efforts toward stimulating the interest of members of our profession in this question, to the end that the money for this project may be forthcoming.

Dr. Miller was an American, and we cannot feel other than that our national as well as our professional pride prompts us to be second to none in the material expression of our appreciation of his master mind.

When he was willing to give of the very essence of himself for the love of serving humanity, we should not hesitate to respond when called upon to do anything in our power to help toward the completion of the plan for a memorial to Dr. Miller.

Very truly yours,

TRUMAN W. BROPHY.

Dr. OTTOLENGUI, in addition to presenting the above communication, said: The question arises as to what the State Society should do at this time, and I feel a little embarrassed in suggesting anything on account of the matter coming to me at so late an hour. I should like to ask what has been done in regard to this matter in the State Society. I see the society is credited with the intention of raising one thousand dollars, but whether that means a contribution from this society to that amount, or whether it is supposed to include what the district societies are to contribute, I do not

know. I understand that the First District has raised a sum of money for this purpose, and the Second District also, and that the State Society made an appropriation last year.

Dr. BURKHART. A resolution was passed last year that a contribution of two hundred dollars be made to the Miller Memorial Fund.

Dr. OTTOLENGUI. The New York State Society is an organization with a branch in each district. The request is made here that the president and secretary act as custodians of the fund for the society. Your committee, therefore, recommends that the secretary communicate with each district society, soliciting contributions for this purpose, that what money they collect be turned over to the New York State Society, and that the sum be transmitted as the fund from the society as a whole.

Motion was made and carried that the report be adopted.

The next order of business was the report of the correspondent, Dr. H. C. FERRIS, Brooklyn, as follows:

CORRESPONDENT'S REPORT.

During the past two or three years the attention of the scientific world has been called to the lack of appreciation of the organ of mastication, and the part which it plays from the standpoint of the physiologist. That this consideration is of importance to the dental profession is obvious.

Statements that have been made by physicians from time to time that a patient might live without mastication and insalivation of food have been misleading. In this year's report your Correspondent has endeavored to secure scientific opinions bearing upon this subject by addressing to 150 pathologists and diagnosticians the following letter:

My dear Doctor,—As Correspondent of the New York Dental Society I am addressing you in behalf of science, and earnestly solicit your consideration of and reply to the following questions:

(1) Do you consider imperfect mastication and salivation of food an etiological factor in diseases of the stomach and intestines?

(2) If so, what pathological conditions result from such neglect?

(3) Will you briefly state your scientific reasons for your belief?

May I ask the favor of a reply to be incorporated in my report in May 1909? Any courtesy you may extend will be appreciated by the dental profession in New York state.

To this he has received the following replies:

G. V. BLACK, dean Northwestern University, Chicago, Ill:

I have received your letter and also the paper requesting a reply to certain questions.

(1) Imperfect mastication and salivation of food is certainly a factor in disease. For many years now I have been giving special attention to the matter of the ability of patients to chew food. The evil results are apparent in the mouth first of all. Caries of the teeth and disease of the peridental membranes of some form is sure to result sooner or later, and the patients are put in a condition in which they seem unable to bear the effects of disease that may come to them in the course of their lives as they would do if the teeth and mouth were in a healthy condition and the chewing of food could be done normally.

This was strongly impressed upon me very early in my practice, and I have seen many persons, young mothers particularly, who have lost their lives with apparently the condition of the teeth and the inability to chew food as the basis of the evil results, in that it rendered them unable to withstand the conditions of disease which came to them, which otherwise they would have thrown off without difficulty. In this I reckon the disease existing in the mouth as a prominent factor in the evil results. People with no teeth do better than those with teeth which they are unable to use normally.

I write this hurriedly immediately upon receipt of your letter, because I do not see before me time to give the really proper consideration to the subject. It is an exceedingly important one, and one to which very much attention should be paid. It seems to be utterly neglected by the dental profession. I have made this wholesale answer instead of answering your specific questions because it seemed necessary at the moment.

LEO F. RETTGER, bacteriologist, Yale University, New Haven, Conn.:

I regret to state that I am unable to answer the questions sent me, further than to say

that it is my firm belief that imperfect mastication and salivation of food may be an indirect cause of certain diseases of the stomach and intestines.

According to Fletcher, Chittenden, and others, perfect mastication of food has a most beneficial effect on the digestion and utilization of foods, and consequently on the general physiological condition of the body. As soundness of the digestive organs and the body as a whole tends to protect the body against bacterial injury, perfect mastication and salivation must, at least in a measure, play a part.

A. WADSWORTH, pathologist, Columbia University, New York:

In reply to your letter, I would like to express my appreciation of the honor conferred by your request for my opinion on the questions proposed. I regret that in the brief time at my disposal it is practically impossible to give a comprehensive discussion of the facts and theories involved in the consideration of the very subtle pathological and physiological changes determining the vicious cycles set up in the stomach and intestines by imperfect mastication and salivation of various foods.

Suffice it for present purposes that it is generally recognized that varying degrees of digestive disturbances are so caused; that when there are also abnormal conditions due to previous or chronic disease of the stomach, intestines, or other parts of the body, these disturbances of digestion are greater and more persistent and serious in their nature and their effect on the health of the individual; and further, that determinations of accurate experimental and clinical data in support of such conclusions are plentiful and significant.

Prof. RUSSELL H. CHITTENDEN, Sheffield Scientific School of Yale University, New Haven, Conn.:

I am in receipt of your inquiry regarding the effect of imperfect mastication and salivation of food as an etiological factor in diseases of the stomach and intestines. In reply thereto, I must say that I have done no experimental work bearing directly upon this problem. The studies which I have been carrying on in my laboratory during the past few years have had to do with an attempt to determine the real nutritive requirements of the human body, especially for proteid food.

The question of mastication and insalivation of food I have not considered at all. On general principles, however, I have no doubt that imperfect mastication, accompanied by

a too hasty swallowing of food, is detrimental—in a measure at least—to health, especially where there is a disposition toward weakness of the digestive tract.

I do not feel, however, that I am warranted in making any scientific statements, as I have no data of my own on which to found an opinion.

MAX EINHORN, M.D., New York city:

(1) Do you consider imperfect mastication and salivation of food an etiological factor in diseases of the stomach and intestines?

Yes.

(2) If so, what pathological conditions result from such neglect?

Catarrh of the stomach and some functional disturbances of this organ.

(3) Will you briefly state your scientific reasons for your belief?

By paying attention to eating properly the above ailments frequently disappear.

Dr. Einhorn in a paper entitled "The Art of Eating Correctly" published in the *Medical Record*, January 7, 1905, defined two diseases: Tachyphagia, the harm of eating too rapidly, and bradyphagia, the harm of eating too slowly, which he illustrated with a case from his practice.

Mr. HORACE FLETCHER, New York city:

In answer to your letter, am sailing for Europe—"Mauretania," 5th—to be back the middle of June.

No time to answer questions now, but enclosed reprint will perhaps answer them.

Mr. Fletcher, in a paper read before the Seventh and Eighth District Dental Societies of the State of New York, November 14, 1908, and reprinted in the *Cosmos* for February 1909, stated that:

The results of our experiments for the last ten or twelve years have shown that when food is properly treated within the small section of the alimentary canal under our voluntary control, we have no evidence, apparent to the senses, that there is any more alimentary canal beyond the throat. We forget that we have a stomach, forget that we have intestines, and the whole process of involuntary digestion is done so completely and easily that we have no thought or care in the matter at all. What we want to do is to concentrate our attention on the things which are our own particular responsibility, and let nature do her self-assigned part of the work uninterrupted, uninterfered with, and unquestioned.

Consider the complexity of that small three inches of the alimentary canal and how much of importance happens in and around the mouth! There is where nearly all the sensations are expressed.

Nature does everything she can do to concentrate your attention there, where is enjoyed all the pleasure of eating and where she first protests if the act of eating has been careless.

GLENTWORTH R. BUTLER, Brooklyn, N. Y.:

(1) Do you consider imperfect mastication and salivation of food an etiological factor in diseases of the stomach and intestines? Yes.

(2) If so, what pathological conditions result from such neglect?

Delayed and imperfect digestion, with consequent formation of irritating material. Result: Gastro-intestinal catarrhal conditions.

(3) Will you briefly state your scientific reasons for your brief?

Mainly clinical experience.

BERNARD R. LEROY, Athens, Ohio:

I regret that I cannot answer these questions as asked, because of the limitation to diseases of the stomach and bowels. Permit me to say that I have made a careful study of the saliva in cases of the idiopathic epilepsy, arterio-sclerosis, chronic syphilis, and cataract of the lens. These studies being foreign to your questions, would be out of place in your report.

J. P. BUCKLEY, Chicago, Ill.:

Your letter inclosing questions at hand. In reply will say that surely imperfect mastication and salivation will ultimately produce perverted functions in both the stomach and intestines, especially the former. This has been so clearly demonstrated clinically that I do not think you will find any thoughtful practitioner of either medicine or dentistry who would give you a negative reply to your first query.

The pathological conditions which may, and far too frequently do, result from such neglect are many, and depend largely upon the individual. Acute and chronic indigestion, with all of its attendant evils, and even gastric ulcer, may be mentioned.

The reasons for these conclusions are obvious. Cell metabolism depends upon the assimilation of material for reconstructing the lost or utilized elements in the vital processes of the body; perfect assimilation de-

pends upon perfect digestion, and this latter process depends upon the thorough comminution of the foodstuffs and mixing them with the secretions of the alimentary tract. A rule in the administration of medicines by way of the stomach is to give the medicine in solution, or else in such form as to become soluble in the stomach or intestines. Nature's method of converting foodstuffs into soluble substances that it may be assimilated is to have the food thoroughly masticated and mixed with the secretions of the mouth, stomach, and intestines. To neglect this is to neglect nature's first principle of life, and the result of such neglect means disease and ultimate death.

GEORGE F. LAIDLAW, M.D., New York city:

In response to the inquiry of the New York State Dental Society I send replies as follows:

(1) I think imperfect mastication and salivation of food an important etiological factor in diseases of the stomach—not so much of the intestines—especially in old age.

(2) The conditions produced are mere subjective symptoms, discomfort after eating, which goes by the name of dyspepsia, but I cannot say that I have seen an actual catarrhal condition or organic lesion thus produced.

(3) Observation of people with functional dyspepsia, especially in old age, which were greatly improved after the teeth were repaired and thorough mastication made possible.

EUGENE S. TALBOT, Chicago, Ill.:

(1) Do you consider imperfect mastication and salivation of food an etiological factor in diseases of the stomach?

Yes.

(2) If so, what pathological conditions result from such neglect?

Acute and chronic gastritis, carcinoma, etc.

(3) Will you briefly state your scientific reasons for your belief?

Imperfect mastication and salivation lead to mechanical irritation of the mucosa, and mechanical irritation leads to carcinoma.

JACOB FUHS, M.D., Brooklyn, N. Y.:

The following answers to your questions are derived from personal experience:

(1) There is no doubt that imperfect mastication and insalivation are etiological factors in diseases of the stomach and intestines.

(2) Hyperemia, excessive secretion of mucus, and hypersecretion of gastric juice. If this condition is prolonged, congestion of

the mucosa results, with interference with the function of the pylorus and of the cardia. This condition leads to retention and fermentation of the gastric contents.

The excessively acid and irritating stomach contents are responsible for the frequent occurrence of cardio-pyloric spasm, one of the most painful affections.

At times the spasmodic contraction is confined to the pylorus, while the cardia remains open or opens readily. Then the food and gases regurgitate until the pyloric spasm is relieved.

Disturbances of a similar nature occur in the small intestine, when the improperly prepared food reaches this organ. Spasms, disturbances of secretion and mobility result, with impairment of absorption.

(3) The great importance of thorough mastication has been shown in many of my patients who were suffering from achylia gastrica, and in others with greatly diminished gastric secretions.

In these cases the subnutrition, the diarrhea, the flatulency, the decided emaciation, all disappear with a very finely broken up diet and with careful mastication. In some instances the gastric secretion reappeared, and although in others this secretion was permanently lost, the patients remained in good health through care in the administration of food and its fine division.

It is of the greatest importance to use the utmost care in mastication in diseased conditions of the digestion tract associated with hypersecretion and hyperesthesia.

It is easily demonstratable that coarse food increases the pathological secretions, accentuates the hyperchlorhydria, and augments the hemorrhagic transudates and the secretion of thick mucus.

A glance at the microscope shows at once the decided difference between foods introduced into the stomach in a finely divided state and those taken in coarse pieces. In the former case each starch granule is separated from its neighbor, meat fibers rapidly liquefy and disappear, and mucus is present in very moderate quantity. In the latter, the starch granules and meat fibers are in lumps, surrounded by thick mucus.

TRUMAN W. BROPHY, Chicago, Ill.:

My answer to your letter from the New York State Dental Society is as follows:

(1) I certainly regard imperfect mastication and salivation an etiological factor in diseases of the stomach and intestines. I believe there is conclusive evidence that gas-

tric and intestinal diseases are caused by imperfect mastication and salivation.

(2) Indigestion, intestinal catarrh, and consequent failure of assimilation are among the conditions due to imperfect mastication and salivation.

(3) Scientific reasons for my belief are purely physiological. Mastication is an important function, dividing all food into small particles so as to make salivation the easier, and to enable the gastric juice to more easily accomplish its work in digesting the food, thus enabling the process of assimilation to be normally accomplished.

I believe that this brief explanation of my views answers your questions. I regret that these answers have been delayed until so late a date, but I assure you it was through no fault of mine.

Your Correspondent, in drawing his conclusions, would accept Dr. Buckley's statement in which he says that I would have difficulty in getting negative replies to questions asked as an illustration of the attitude of a large percentage of the medical and dental fraternity in reference to scientific investigation along this particular line of study.

The evidences are so conclusive and the treatment necessary for correction so simple in the eyes of the medical world that they entirely ignore, with but few exceptions, the consideration of mastication and insalivation of foods in their treatment of the alimentary canal.

A child with malocclusion, or an adult with pus-discharging sinus and pockets apparently are of but little importance to our medical brothers. In passing through wards in hospitals one may observe how total disregard of oral hygiene is displayed. If this etiological factor is so obvious, will someone tell why it is so uniformly neglected?

Pathological conditions of the stomach and intestines are being treated daily by pathologists with utter disregard of the organ of mastication and its ability to functionate normally.

Dr. Fuhs has given us some scientific information which he has been able to prove after careful study, for which we are greatly indebted.

Respectfully submitted,

HENRY C. FERRIS.

Discussion.

Dr. R. H. HOFHEINZ, Rochester. I have nothing to add to the discussion of the paper, except that I should like to reiterate what Mr. Horace Fletcher has said, in his paper at Rochester, namely, that by his method of proper mastication he could reduce the food to half of the amount and increase the activity of the child to double the amount that it had been before. If that be true, it is sufficient evidence that the report of the Correspondent has been most excellent.

Dr. E. H. BABCOCK, Brooklyn. As an axiom is a self-evident truth, so this paper, bringing to our minds a self-evident truth, is axiomatic. Any person who has stood over the dental chair for a number of years has had the truth of the essayist's report impressed upon him. In this connection I would particularly mention the case of a man who had been suffering from chronic dyspepsia for a number of years, until he could take almost no food without discomfort and distress. It became my duty to put his mouth in order. As he was a man who was used to biting on his front teeth and had a long flowing mustache, I did not hesitate to thoroughly build out his teeth with gold caps, because he did not show them. The improvement in his health as well as in his disposition, was remarkable.

I wish to bring out another point, and that is that people who masticate their food thoroughly and carefully are not apt to take a mouthful of food and then a swallow of water. It is supposed that nature supplies all the glands in the body—the various glands being so constructed that they elaborate their secretions in proper amounts and in proper proportions. These secretions are not simple fluids, but more or less complex. The individual who, after taking a mouthful of food, takes a quarter of a glass of ice-water, is very apt to disarrange nature's plan in the matter of the composition of these various digestive fluids. To my mind it is evident that the person who masticates thoroughly not only gets more good out of his food,

or, as Fletcher says, more energy, but it seems equally reasonable to suppose that the general health will be better by virtue of the fact that nature is thereby enabled to carry out the plan of digestion from the first reception of the food to its final elimination from the body. Nothing that we can preach will be of greater benefit to our patients than the axiom of thorough mastication.

Dr. A. L. SWIFT, New York. I can add very little to this discussion further than to thoroughly commend the report. We have repeatedly seen the efficacious result of proper mastication, and we cannot lay too much emphasis upon the necessity of oral hygiene, particularly in mouths affected with pyorrhea, in which the mixture of food with pus and toxic germs must certainly have a deleterious effect upon the digestive tract. In accordance with this paper we must not lose sight of our personal duty as practitioners to create and maintain as far as possible oral hygiene in the mouths of our patients, and particularly where there are pyorrheal pockets, to instruct our patients of the necessity for oral hygiene. Dr. Ferris is to be commended for his effort to impress the importance of proper mastication and insalivation. It is our duty to impress upon our patients the necessity for proper mastication, and to see that they have as far as possible proper organs with which to perform this function.

Dr. R. E. LUTHER, Batavia. I would not feel satisfied to sit still after hearing the report of Dr. Ferris and not to commend the report of the work which he has taken up. In my report as corresponding secretary of the Eighth District Society this year I took up very much the same subject, and became very much interested in it. I am sure that Dr. Ferris will agree with me that it is an intensely interesting subject. I find that while the medical men have been paying some attention to the organ of mastication, they do not appreciate the important rôle which it plays in the plan of general bodily nutrition. I remember that Dr. Campbell of London mentioned the importance of mastication, empha-

sizing the attachments of the muscles to the jaws and the hyoid bone, those attachments tending to pull in every direction and make the jaws larger, the nasal passages wider, with less liability to adenoids and a generally better facial formation. Professor Fisher of Yale has also taken up the study of mastication of foods in a given number of volunteers, and the results that he has been able to show with these subjects are of great interest to the dental profession. It seems to me that the people will best become educated in this respect by first learning that there is a use for the teeth and what that use is. Dental hygiene, it seems to me, while we all know its importance, is, as far as education of the public is concerned, a secondary consideration. Unfortunately, all people do not give the profession credit for honest intentions, as evidenced by the fact that the physicians of Indiana vainly tried to pass a bill rendering it compulsory for physicians to administer silver nitrate to the eyes of every newborn child, the legislature refusing to pass that bill, saying that it had a selfish motive. Yet we all know that one case of blindness out of every three would be prevented if this precaution were taken, which could be accomplished by any competent nurse. It seems to me that we should gain more by proving to the people that there is an actual use for the organs of mastication, and that the proper use of these organs would render them more healthful; then oral hygiene would naturally and necessarily take care of itself.

Dr. M. L. RHEIN, New York. The admirable report which our Correspondent gave us last year has been far exceeded by what he has presented here tonight. I know of nothing that can compare in importance with the subject of the Correspondent's report, and the magnificent *résumé* which he has given us of the opinion of eminent physicians as well as pathologists throughout this country, when published, will place this matter before the scientific world in a form in which it has never appeared before. There is no practitioner in this room who cannot clinically recite to us

what he has accomplished by restoring the proper occlusion in a mouth in which occlusion was impossible. As a profession we understand thoroughly the merits of this subject, that is, the value that insalivation of the food has in nutrition. Let us not lose sight of the fact that this is the keynote of what our Correspondent has presented to us tonight.

I wish to call attention to the reply received from Dr. Black. Wherever there is difficulty of occlusion, or where malocclusion exists or anything that interferes with proper occlusion, malnutrition ensues.

This subject is fraught with utmost importance to us as a profession. As practitioners we have paid altogether too little attention to its significance, and as teachers we have not properly presented it to the world at large. The admirable report of our Correspondent has opened a wonderful field to us, and should make us realize that it is impossible for anyone to be healthy and strong unless he can insalivate his food properly. If we as a profession lay these facts properly before the world at large, the status of dentistry will be properly appreciated.

Dr. FERRIS (closing the discussion). I am very glad that such interest has been shown in my effort in this particular field. I wanted to whip the dental profession through this means, and I think that you get out from under it very well.

Suppose you go to a pathologist with an ache in your stomach, what do you expect him to do? Do you expect him to give you a pill and send you away, or do you expect him to understand what is the trouble with you? You expect him to understand the chemical process that is going on in your stomach. He applies a stomach-pump, chemically analyzes the contents of the stomach, and makes his diagnosis. It is not very difficult to take a specimen of saliva from the oral cavity, and, as specialists of the oral cavity, are you not supposed to know the chemistry of that cavity? Yet how many of us do know it? There is not one. We do not know the chemistry of the oral cavity, and it is pretty

near time that we get busy and find out. If we consider ourselves scientific men and wish to take our proper position in the healing art, we must study the scientific side of our specialty.

The next order of business was the report of the Law Committee, by Dr. WILLIAM CARR, New York, chairman.

Motion was made and carried that the report be accepted and placed on file.

The Business Committee, through its chairman, Dr. Burkhart, reported that the program for the Friday morning session would be the Address of the President, followed by the report of the Committee on Necrology, that to be followed by papers by Dr. Talbot and Dr. Friesell.

Dr. J. O. McCALL, Binghamton, presented a report with regard to the establishment of a Dental Hygiene Council, as follows:

REPORT ON THE ESTABLISHMENT OF A DENTAL HYGIENE COUNCIL.

The Dental Hygiene Council of New York State shall be made up as follows: Six members from the State Society, two members from each district society. Other dental societies of three or more years' standing within the state shall be invited to appoint one member each to serve on the council.

The first appointment shall be for two years. After that appointments shall be for four years, and shall be so arranged that the terms of three members from the State Society and one from each district society shall expire every two years. Members may be reappointed. The members of the State Society appointed when this plan is adopted shall constitute the Executive Committee of the Dental Hygiene Council until the organization of that body, after which the Executive Committee shall consist of the officers of the council and the chairmen of the subcommittees. District and local societies shall appoint members to serve on the council at their next semi-annual or annual meeting following the adoption of this plan. All appointments shall be subject to the approval of the Executive Committee, or those members of it whose terms hold over. The object of this council shall be the maintenance and betterment of the national health, especially through the agency of dental hygiene, and the advancement of the dental profession. This council shall re-

port annually to the Dental Society of the State of New York, and shall not be discharged except by a two-thirds vote of that society.

Motion was made and carried that this report be adopted.

The next order of business was the report of the Fellowship Medal Committee, by Dr. R. Ottolengui, chairman. The committee reported that inasmuch as Dr. Talbot was not present to receive his medal awarded last year, it would be presented to him at the present session. The committee reported that Dr. M. H. Cryer of Philadelphia had been chosen to receive the medal awarded for the present year.

The meeting then adjourned until Friday morning at 9.30 o'clock.

FRIDAY—Morning Session.

The meeting was called to order by the president, Dr. L. Meisburger, at 9.30 o'clock Friday morning, May 7th.

The first order of business was the President's address. Dr. B. C. Nash, vice-president occupied the chair while the president, Dr. L. MEISBURGER, read his annual address, of which an abstract follows:

PRESIDENT'S ADDRESS.

Gentlemen,—On this and similar occasions the one thing that seems to me least important is the address of the retiring president. Yet this formality has become so firmly fixed as an invariable custom to be observed at such times that I feel that I should be unwarranted in violating precedent to the extent of omitting it from our regular order of business.

With your kind indulgence, I wish to allude to a few of the things which have seemed to occupy more or less of our time during the past year to the exclusion of matters of greater importance. The first is the agitation which has been stirred up during the past year, of reorganization, or to be more correct, organization of the National Association, which naturally would affect our society. I have re-

frained as a member of the National Association from accepting the invitation of one of our members to express through the medium of one of our leading journals my views on this subject, as it seemed to me that this being a matter of so much importance, the proper place for me, as the executive officer of this society, was to incorporate what I might have to say on this subject in my address.

The first thing to be considered is, Are we ready for such a radical step as outlined in the proposed change, and will it remedy existing conditions? My answer would be a conservative one, inasmuch as it seems to me that we should first have some evidence of the desire on the part of the men comprising our ranks to affiliate themselves with their respective district societies. It has been said that the number eligible to permanent membership in our State Society is too small. This from personal observation I think to be true, especially as it pertains to the First and Second district societies, and to relieve this condition I would recommend that the number of permanent members of all district societies be increased from two to five. This will give us an opportunity to ascertain if there is a greater demand for admission to our societies, and at the same time materially increase the membership in the National Association, as the doors of that society were opened last year to all members of the various state societies in good standing upon presentation of a certificate signed by the president and secretary of their respective state societies.

This is a matter of great importance, and whatever is done should receive our most mature thought and deliberation, and whatever the outcome, let it be for whatever is best for the advancement of the interests of the profession at large, irrespective of any self-advancement.

We must consider the vast amount of labor which would necessarily be entailed in such a change, and also what would be the attitude of the men were they compelled to pay higher dues admitting them as members to the various societies. Unfortunately the men attending meetings

not in their immediate vicinities seem to be in the minority, and from my experience as treasurer for a number of years of one of the district societies, I fear that the compulsory clause in the plans for reorganization might tend to a certain extent to deplete our ranks.

To substantiate what I have said in reference to attendance, and what I may term in friendly criticism and as a reason for my argument for mature consideration of the matter of reorganization, lack of interest, I should like to call your attention to the number of practicing dentists and those having membership in their state societies in a few of the states comprising this great empire:

	Regist'd pract'g dentists.	Members of state societies.	Per- centage.
Alabama	590	168	28.47
California	1800	300	16.66
Dist. Columbia.	350	93	26.57
Illinois	3000	1423	47.43
Kansas	800	300	37.5
Maine	400	110	27.5
Minnesota	899	425	47.27
New Jersey	1137	276	24.26
New York	3000	275	9.166
Pennsylvania ..	3800	350	9.21

And now as to the number who have affiliated with their respective district societies in our state:

First	236	Fifth	82
Second	162	Sixth	79
Third	49	Seventh	97
Fourth	55	Eighth	113

These figures were computed about a year ago, and the following increase in membership in all but three of our district societies seems to bear out my contention that there is no unusual demand for admission to our ranks.

The following are the reports received by me in response to a query from the various secretaries as to the number of new members admitted during the year. I would say that it was not possible to get the exact figures to date, as some of the societies meet but once a year to elect members, and as those meetings are held just previously to our state meeting, I could not get them in time to incorporate in my address.

The First reports forty-one active members.

The Second reports nine new members and three names to be voted upon at their next meeting.

The Third reports no new members. Members elected at annual meeting.

The Fourth reports twelve new members. Members elected at annual meeting.

The Fifth reports five new members.

The Sixth reports four new members.

The Seventh reports seven new members at last spring's meeting and seventeen to be balloted for at the next regular meeting.

The Eighth reports fifteen elected and eight before board of censors.

Thus it will be seen that in but three societies was there any unusual activity in the number of new members admitted.

The First district shows a splendid addition to its active list, but when taking into consideration the number of practicing dentists in their territory, this appears to be but a normal condition.

The increase in membership in the other two societies can be attributed to other causes than a desire for a change in our present plans of reorganization. In the Seventh it was due entirely to the splendid meeting, which aroused the enthusiasm of those privileged to attend; and in the Eighth we have made a special effort to bring men into our society that they may enjoy and appreciate both the educational and social advantages which may be established by society affiliation.

In view, therefore, of all these facts, I must take an optimistic view of the situation, and feel that we need not have any apprehension as to the immediate future, at least, of our society. If I were asked what I would suggest as a remedy for the apparent lack of interest and attendance upon our meetings, I would say that if we had the proper co-operation and inspiration to do things, not the kind that comes when a flash of lightning strikes us as we are waiting for somebody else to do something, our attendance would soon take on proportions that would measure up to the standard so much desired.

As an illustration of what I wish to

convey by the above remarks, let me refer to a union meeting of two of our district societies which met in Rochester last fall, and where most of the work was done by members of the Rochester district, who worked in harmony, and were determined to see what could be done in the way of attendance. They were able to attract to that meeting, lasting three days, six hundred dentists, and to hold them until the last session. This demonstrates what can be accomplished by hard work, perseverance, and unity of sympathy and motive among our members, and shows what this society could do to bring to this meeting more men than any hall in Albany could hold.

Another matter which I wish to allude to but briefly, and which has caused some feeling not conducive to our best interests, has been the Taggart patent suit. This I consider a most unfortunate occurrence, and one which would take us back to those days not forgotten by the older men in our profession, when a royalty had to be paid on rubber used in vulcanite work. Had Dr. Taggart maintained the relations with his fellow workers which I am sure that at heart he always cherished, he would have received that pecuniary consideration which no one denies was due him, and which should be his for the many hours of hard work and waste of nervous energy which he expended in the perfection of his machine. Let us hope that this controversy may be obliterated from dental history, and that Dr. Taggart will see his folly and come back and be received into the fold, as the returning prodigal son.

Now a few words as to matters which have not had the proper consideration that we as dentists owe to the public, and which must receive our attention in the near future, as other states and other countries have taken them up. I refer to dental hygiene. Dr. John Oppie McCall of Binghamton, a member of the Sixth district, who has taken this matter up and who has given much time and thought to matters pertaining to this work, in an interview gave me an outline of what he thought a feasible plan [see page 1193], as follows:

There should be formed in New York

state a Dental Hygiene Council, to work with other state councils as formed, and with a national council, if formed.

Object: Maintenance and betterment of national health through oral hygiene; Advancement of the dental profession.

Will endeavor to improve conditions in the following fields: (1) Hygiene of school children; (2) Education of the laity in oral hygiene; (3) Education of the medical profession along dental lines; (4) Institutional dental work, and (5) Army and navy legislation and other matters.

Make-up of Council:

Six members of State Society.....	6
Two members each District Society....	16
One member each local society.....	10
Total	32

First appointees to serve two years; after that, members appointed for four years, terms expiring in rotation. All appointments after establishment subject to approval of Council.

Program of action:

(1) (a) Universal examination of children's teeth. Aim to eventually have examination and treatment furnished by state. (b) Collection of statistics of children, showing bearing on general health.

(2) Campaign of public education—(a) Through school, by leaflets and talks; (b) Publicity.

(3) Medical education—(a) Encouragement of reading papers before medical societies; (b) Effort to get dental representation on medical school faculties.

(4) Investigation and collection of statistics in regard to state institutions; work with educational publicity committee to arouse public sentiment in regard to conditions in institutions; endeavor to improve these conditions.

(5) Any other work along these lines.

We should do all we can in our power to assist in this reformation, and while I know that much is being done in New York city toward the establishment of dental infirmaries and clinics, and much good must necessarily result, still we must lend encouragement whenever we

can to increase this work and encourage others to engage in it. Many of our dental infirmaries are hampered by a lack of funds. This for a time, at least, might be remedied by interesting and demonstrating to men of means, especially to those charitably inclined, the vast amount of good that would result from an endowed institution where the mouths of the poor could receive proper attention.

The President's address was referred to the following committee: Dr. H. J. Burkhart, Dr. E. G. Link, and Dr. F. W. Low.

The Business Committee reported as the program for the afternoon session the report of the Committee on Practice, followed by a paper by Dr. Head, that to be followed by the awarding of the Fellowship Medals, with the election of officers a special order of business at 5 o'clock; the program for the evening session to be papers by Drs. Fickes and Squire.

The next order of business was the report of the Committee on Necrology, by the chairman, Dr. F. L. SIBLEY, Rochester, which consisted of an eloquent eulogy of Dr. A. L. Northrop, of whom an obituary notice appeared in *Cosmos* for October 1908, vol. 1, page 1152.

The next order of business as announced by the President was the reading of a paper by Dr. E. S. TALBOT, Chicago, Ill., entitled "Hard Teeth and Soft Teeth."

[This paper is printed in full at page 1147 of the present issue of the *DENTAL COSMOS*.]

Discussion.

Dr. R. OTTOLENGUI, New York. I felt very much embarrassed when the president notified me that I was to open the general discussion of this paper, because I am not a scientist, and I hope no one will accuse me of ever having posed as such. That, however, has nothing to do with my loyalty as a member of this society and my willingness to serve in any capacity to which I am appointed. I have been consoled by the one thought that, after all, perhaps it may be well that someone should discuss

this paper purely from the clinical aspect.

In law, in the consideration of the value of evidence one fundamental principle is recognized. The lay mind looks with some disfavor at what is called circumstantial evidence, but that is because the lay mind does not comprehend the value of such evidence. Circumstantial evidence is certainly as valuable and often more valuable than direct evidence, because in itself it never lies, whereas direct evidence often does lie. The trouble with circumstantial evidence lies with the reader; if we read it wrongly we come to wrong and illogical deductions. Direct evidence, which means a man's statement that he saw a thing, is of no value unless it is supported by circumstantial evidence. For example, if you say you saw a man being killed, it becomes necessary to produce the body or some other evidence to substantiate the statement that the man has been killed. So your direct evidence must be substantiated by circumstantial evidence. Also in considering circumstantial evidence, it is necessary to have direct evidence to support it. The point which I want to make is that clinical experience is of no value unless it can be based upon scientific facts, and in the same way scientific theories cannot be considered as substantiated until they are supported by clinical facts. I wish to take up this paper, and if possible point out a few things; not that Dr. Talbot's statements are not true, but a few of them seem to me open for discussion as not having been proved, however interesting they may be.

In the first place, the essayist tells us that Dr. Black admits that teeth diminish in strength with advancing age; that when the pulps are lost, the teeth discolor, lose strength in a marked degree, apparently from deterioration of the organic matrix; that when the pulps have become so much decalcified as to cut off nutrition, the crown portions of the dentin lose strength, apparently from deterioration of the organic matrix; that the teeth of old people, and especially those in which much calcification of the pulps occurs, deteriorate in strength. It seems

to me that throughout the paper, unless I fail to comprehend it, the author has somewhat confused the meaning of strength and softness. It does not seem to me that Dr. Black means in that paragraph that the tooth which has lost strength is what we would call a soft tooth. The important point is this: All of the conditions described in that paragraph are in a sense *pathological*, whereas I comprehend soft teeth to be *physiological* teeth, normal teeth. The distinction between hard and soft teeth, as it has been made in reference to resistance to carious action in the mouth, does not indicate or it is not intended to include these pathological conditions. Teeth certainly lose strength by deterioration or disease of the organic matrix, but, as the author admits in his paper, we also have seen teeth which vary in density, physiological hardness or softness, and in my opinion we may more clearly understand the essayist if in his closing discussion he will differentiate between soft teeth and teeth which simply have lost some of their resistance owing to pathological conditions.

In another paragraph the essayist makes a statement in which I am interested, and in regard to which I should like to hear more in the closing discussion. In speaking of the fundamental changes in the face, by which the face is foreshortened because of the growth of the brain cavity, he makes this statement: "The brain gains in evolution at the expense of the face, nose, jaws, and teeth, which naturally grow smaller and hence degenerate. Another factor to be considered is that structures like these, which are passing, are transitory and more easily affected by disease. Neurasthenia in the parent and disease in the child produce an unstable nervous system, resulting in excess or arrest of development of the bones of the face, nose, and jaws, as well as affecting the structure of the teeth." Here again I am at a loss to follow the author. I may be absolutely ignorant in the matter of bone formation and bone growth, but I have not been able to comprehend the condition here described, that is, that there

may be an excessive growth in otherwise normal bone. I readily comprehend a pathological excess in the growth of bone, such as the conditions of excrementosis, or exostosis, or bony tumors, all of which are enlargements of bone resulting from pathological processes, but I cannot comprehend an excessive growth of bone in the development of a child otherwise normal. Whenever I see a disparity in the size of the jaws, I cannot help feeling that the larger one is normal and that the smaller has suffered from lack of development. For example, when I see a so-called very large mandible, my eye rests on the upper jaw, and it always seems to me too small for the "balance" of that face. On asking a prominent pediatric physician whether, when one leg is found to be longer than the other, he considers the longer as overgrown and whether it is the long leg that is at fault, I was told that in some cases he would consider the longer leg as deformed. And yet the standard by which these specialists determine that seems to me rather unreliable; they have a system of measurements of arms and legs and other portions of the body, and if on comparing these two legs with the general measurements they find that the short leg agrees with the system of these measurements, they decide that the other leg is too long. Yet the same physician admitted to me that usually in those cases a dislocation of the hip-joint is found, which very probably accounts for the disparity in length.

Dr. TALBOT. Did you ever see microcephalia or macrocephalia?

Dr. OTTOLENGUI. These are pathological cases.

Dr. TALBOT. There you have your answer.

Dr. OTTOLENGUI. I have to confess that I have never seen these cases except in pictures, but I should consider them pathological monstrosities, and not healthy normal phenomena. It seems to me that a certain amount of nutrition passes to the respective parts during development, and that bone is built up by the cells properly utilizing this nutrition. I comprehend how in some por-

tions of the body for many reasons nutrition may not be properly utilized, in which case that part may suffer a lack of growth while all the rest of the body may be normal, but somehow I find it difficult to understand how that same part may get such an excess, as it were, of nutrition that it would overgrow and be larger and out of proportion with the rest of the body. If this were the case, however, I should expect the microscope to show a totally different, a pathological cell arrangement. It is simple to say that the part which is larger is simply over-nourished, but just how a part can take care of a surplus amount of nourishment is something that I have not been able to comprehend.

I believe that the most important item of the subject presented to us by the essayist consists in the numerous diseases which may attack the pulp, and the other systemic disorders from which the teeth may suffer and soften. I am ready to admit all of these possible diseases of the pulp, and I consider this an exceedingly important problem for us to study in the future, because such knowledge is destined to revolutionize and in fact has already revolutionized our practice in relation to pulp-conservation. But consider the second proposition, and see how important it will be for us to have a scientific knowledge as well as a mechanical one, to enable us to decide as to whether we shall or shall not destroy a pulp. On the one hand we are told by Black, as admitted by the essayist, that the loss and destruction of the pulp results in the breaking down of the organic matrix of the tooth and in a weakening of its strength; I do not fully understand how it softens the tooth, nevertheless it renders the tooth more friable, less resistant to the stress of mastication, and more likely to break in the mouth. On the other hand, we are notified now that there are numerous diseases of the pulp which may all be in existence at the time when you decide to save the latter. Therefore, in the hope of saving a possibly diseased organ in the body, we may produce trouble for ourselves and for the patient; consequently we must

determine whether a pulp is diseased or not. It is therefore important that we be able to differentiate between diseased pulps and those that may be safely left in the tooth. Then, when we come to the conclusion that a pulp must die, we must not overlook what has been demonstrated to us, namely, that a tooth without a pulp is less able to withstand the stress of mastication than it is when the pulp is sound. Therefore we must cut our teeth more than we have done in the past—not with the idea of preventing recurrence of decay, but in order to so arrange our filling that it will protect the tooth from itself; we must save the tooth from destruction which may occur owing to its increasing weakness. In other words, if in filling a molar we find one-quarter of the tooth badly undermined with caries, and weak, it is better to remove that entire corner, cut down to a sound foundation and build up with the filling material. It is fortunate that the clinical workers have progressed hand in hand with the investigators who bring this message, and that we have so improved our technique, through the gold inlay, that we can cut away more structure than we did years ago and can replace this with a material which will do the work for which it is intended.

I should like to call the attention of the essayist to the fact that while I am ready to believe that the pulp is liable to all these diseases, and while for that reason we should be very careful in what condition we leave a pulp in a tooth to be filled, he has not proved in his essay that these diseases may attack the pulps of teeth in which the crowns are sound. By this I do not mean that pulps in sound teeth may not die from traumatism, or because of infection from pericemental or pyorrheal abscess. As far as clinical experience goes, we have no diseased pulps in teeth which have not been attacked by caries, and consequently the real determination of all disease in the dental organs is based on caries; from that we come back to the proposition that a thorough knowledge and practice of prophylaxis will probably bring us to the safest solution of this whole problem of tooth-salvation.

Dr. R. H. HOFHEINZ, Rochester. There are few questions which interest the dental operator more than the question whether he is filling hard or soft teeth. Clinical operators have never been quite satisfied with the deductions which Dr. Black has made regarding hard and soft teeth, and indeed such an authority as W. D. Miller has doubted some of them.

Among Dr. Talbot's conclusions the following interest me most: (1) There is no basis for the supposition that the teeth of children under the age of twelve years are too soft to receive metallic fillings. (2) Differences in density or in percentage of calcium salts are not the controlling factors in the strength of teeth or their hardness, this seeming to depend upon the condition of the organic matrix.

If, as Dr. Black tells us, the organic matrix is the cause of what we call a soft or hard tooth, is it not possible that during childhood we have as yet an imperfect development of the functional activity of the organic matrix, and thus what we clinicians call the soft teeth of children? After all, the calcium salts proper seem to enter into the question of hard and soft teeth, if the fundamental cause is the organic matrix. The organic matrix could not stand alone; it needs the calcium salts to make the tooth.

(3) "Caries of teeth is not dependent upon any condition of the teeth, but upon the condition of their environments," which would indicate that a tooth is all right under any circumstances. Let us apply Dr. Talbot's broad vision of systemic diseases to this question. Two people of the same age expose themselves to smallpox, tuberculosis, or syphilis. One succumbs to the disease, and the other is not infected. What does this show? A vast difference in the susceptibility of the two people. Why is that not applicable to the teeth? The same environments destroy some teeth, but do not affect others in the same mouth.

The case of the Irishman which Dr. Talbot quoted is an example of the great tissue changes which take place during disease. If after six years interstitial

gingivitis was completely arrested, but the soft teeth remained, this simply indicates that the peridental membrane with its great vascularity was more readily affected by the restorative process than the organic matrix of the teeth.

The discovery of the remarkable fact that among the Egyptians five thousand years ago "dental caries was rare among the people of the lower social status, and almost unknown in children," speaks most emphatically for the degeneration of the teeth. If it is a question of environments, the differences in the methods of living of the Egyptians and those of our highly nervous race furnish good systemic reasons. The old Egyptian mothers of the poor class did not attend a suffragette meeting in the morning, a reception and tea in the afternoon, and a dinner and whist party in the evening, and then go to bed with a stomach filled with cheese, crackers, Bass ale, beer, or whisky. Their work was done almost altogether out of doors. They helped to build pyramids, drank sunshine, and did not suffer from faulty metabolism, which we know is at the bottom of wrong dental environments.

Dr. Talbot makes a fine point in telling us of the relative activity of the brain on the arm and hand, and the struggle in evolution between the face, nose, jaws, and teeth. This justifies the fact that the progress of decay and degeneration of teeth goes hand in hand with civilization.

Dr. Talbot, Dr. Black, and Dr. Kirk tell us that teeth lose strength in a marked degree if their pulps are destroyed, and that they diminish in strength with advancing age. The first of these observations had better be remembered by some practitioners who unhesitatingly destroy pulps at any age for the attachment of crowns, etc.

It seems paradoxical to hear that teeth diminish in strength with age and yet we have much less caries as the patient grows older. This may also be explained by Dr. Talbot's broad systemic statement. Disraeli told us that "Youth is an illusion, middle age a struggle, and old age a disappointment." As we near the state of disappointment, or better, resignation,

our nervous strenuosity diminishes, our sense of what is physiologically correct increases, and thus the reflex shows itself in the mouth by producing better environments for the teeth, with less resistance.

Dr. Talbot says that as practitioners of dentistry we are reminded every day that there is a vast difference between hard and soft teeth. We know that a tooth which has lost its fibrillæ or pulp cuts differently from one that has a normal pulp. No experiments have ever been made to demonstrate the relative value of filling materials in the two classes of teeth. I know from my own experience that most of the teeth which have large approximal or occlusal gold fillings and split either lingually or buccally are pulpless teeth. From that experience I should say that the malletted gold filling is less desirable than the gold inlay. The stress is more directly communicated from the malletted filling to the enamel margins and impoverished dentin than when a layer of cement intervenes.

The great question arises from Dr. Talbot's paper, What is the principal cause and which are the principal organs that contribute to faulty metabolism?

I should like to ask Dr. Talbot to what degree he considers the salivary glands, which are both secretory and excretory, responsible for faulty metabolism? We know that an undue amount of nitrogenous food causes it. Dr. H. O. Beeson of Columbia recently made the statement that all supplementary salt with food is superfluous and distinctly harmful to digestion. Taste for salt is acquired. It does not exist in animals and birds. Salt with food in proportions of four parts to one thousand is beneficial to digestion, but beyond six parts to the thousand it is harmful. Experiments have shown that hyperchloridation renders the blood pathological, inhibiting both assimilation and disassimilation by the damage to the red cells. If such a small matter, which has grown into a national calamity, is one of the great causes of faulty metabolism, we should know it and be guided accordingly. Such men as Talbot, Black, and Kirk, who look at all things from a broad stand-

point, must give us not only the cause of disease, but also the remedy as far as possible.

Dr. E. T. DARBY, Philadelphia, Pa. I do not feel like taking the time which belongs to the members of this society. I have been exceedingly interested in this paper and in the discussion which followed.

It is some years since I have read the statements of Dr. Black in regard to hard and soft teeth, but I remember that at the time I read them I was profoundly moved by them because they did not seem to bear out my own experience and observation as a practitioner of operative dentistry. I recognized, as no doubt all of you have, a difference in the character of teeth. Some teeth were soft and some hard, and I have never yet been able to reconcile with my own experience the statement of Dr. Black that all teeth are equally hard. I was glad that Dr. Ottolengui pointed out in his discussion that teeth might be physiologically hard or soft, and that they might be pathologically hard or soft in consequence of pathological conditions. This was very well observed. I wish, however, to speak for a moment on the fact that teeth which are soft at an early period in life show clinically a greater hardness later in life, and that teeth which are hard at the age of forty may from pathological conditions become soft at sixty or seventy years of age.

I am unable to say what causes that change in teeth between fifteen and forty, but my own experience teaches me that teeth that have been very poor in early life are often very good in middle life, and perhaps remain good until old age. I have in my practice patients who came to me as children, in whose mouths I did not care to insert gold; but I have saved their teeth with tin or plastics, and later on have found them so good that I was not afraid to fill them with any material, no matter how good its conducting properties. I have seen, and no doubt you have seen, teeth so poor that one almost despaired of saving them, yet at the age of twenty-five, thirty, or forty years, they were so good that the patients were prac-

tically immune from decay; I have such patients in my practice whom I have treated for forty years. Who, then, shall say that teeth never change for the better?

Dr. HERBERT L. WHEELER, New York. In discussing Dr. Talbot's paper, it is somewhat of a task not to elaborate so as to offer a paper proper. There is so much contained therein that stimulates thought that one almost hesitates to stop, for fear of not knowing where to stop. It is also a temptation to discuss some of the quotations from Dr. Black. In order to do justice to this paper, I find it necessary to at least ask some questions concerning the quotations from Dr. Black.

One of the quotations is: "There is no basis for the supposition that the teeth of children under the age of twelve years are too soft to receive metallic fillings." This one paragraph contains a world of possibilities in regard to discussion. It is evident that Dr. Black assumes that, because the different varieties of teeth contain the same percentage or practically the same amount of calcium salts in their enamel, dentin, and cement, they are necessarily all of the same texture.

You will see many people whose ability to raise weights by muscular contraction, or to resist cold or external environments unfavorable to life, is much greater than that of others of the same or approximately the same weight. It is probable that an analysis of their muscular tissues, taken after death, would show the same amount of hydrogen, oxygen, nitrogen, and carbon, yet the muscles of one may be found hard and firm, and those of another flabby and weak. Would you then say that there is no difference in the hardness and softness of the tissues of dead teeth, taken from a human jaw, though they be the same, chemically, in material and construction as when in the jaw?

You must remember that the atoms that go to make up the particles of the dentin, or rather the particles of the enamel and the tissues of the dentin and cement, are held together by what we call

an organic matrix, and this substance evidently varies greatly in different cases. The difficulty is that the chemist, even the physiological chemist, is not yet able to use terms that can be interpreted. So, while Dr. Black's experiments were without doubt correct, they in no way point to the conclusion which has just been quoted.

In another passage it is said, "The active cause of caries in a thing apart from the teeth themselves, acting upon them from without, and from a consideration of the facts thus far developed, the logical inference is that the cause of the differences in the liability of individuals to caries of the teeth is something in the constitution," etc. If it is possible for this something in the constitution to affect the vital powers of the salivary glands, and if this cause can also affect the work of the salivary glands, we may ask, Is it not quite possible for it to affect the tissues that receive nourishment and vitality for the teeth? There is evidently some vital connection between these tissues and the hard parts of the teeth. If this were not so, why should a tooth with a dead pulp cut more easily and break more easily than a live one so treated.

It is evident that the conclusions quoted by Dr. Talbot have led the author to the assumption that the vital cause of dental caries is only external environment. It is not to be denied that external environment is an important factor, possibly the most important factor, but it is also evident that the teeth are living human organs, closely and intimately connected with the nerves and the vascular system of the whole organism. It is yet to be proved that the physical condition of these tissues or the effect of the condition of any part of the living system is not really the cause of strength or of lack of strength in the human tissues throughout the body. In other words, it remains to be proved that there is no such thing as hard teeth and soft teeth, if, as I have pointed out, the conditions of hardness and softness are not dependent on the chemical composition of the structure.

The statement that "There is no basis for the selection and adaptation of filling

material to soft teeth, hard teeth, frail teeth (in structure) or poorly calcified teeth," is, I think, not proved. For it is certain—and I am sure that many of you will bear me out in this respect—that it is much easier to break and otherwise injure and mutilate some teeth than others. If the adaptation of filling materials were considered more carefully there would be less prejudice among physicians against dentists. For it is not uncommon for dentists who chiefly consider how best they can pound a mountain of gold into a tooth, to destroy in a two hours' appointment the tone in a nervous patient which it has taken the physician months to obtain.

I can conceive how the so-called soft teeth might resist the onslaught of caries in the human mouth, while so-called hard teeth might, under certain conditions, succumb readily and rapidly to the attack of dental caries; but this is not usual. I believe that Dr. Talbot is correct in contending that the question of the strength and resisting power, or we may say hardness of teeth, is affected by systemic changes, and I believe that these changes take place regardless of the chemical elements that make up the tooth.

There is little doubt that in comparison with ancient and primitive peoples, degeneration of the human jaw in regard to size is taking place in inhabitants of highly civilized countries at the present time, but what is meant by "degeneration" should be defined. The functions of the human teeth have grown less important as the ages have rolled on, and in a civilized country, at the present time, there is not the same demand for strenuous work from the teeth that there was 100,000 years or less ago. The jaws and teeth may be of lighter build and more frail, and yet meet the requirements placed upon them in order to properly perform their function in helping to sustain life. May, then, the necessary change of adjustment of the functions of human organs to changed environments be called a degeneration? Dr. Talbot himself calls this evolutionary process natural.

In spite of the gallery play of the author of the phrase "papa's teeth in ma-

ma's jaws," I am glad to observe that Dr. Talbot contends that just this may happen, inasmuch as the tissues of all kinds are greatly affected by inherited peculiarities and tendencies.

Dr. Talbot's statement that the teeth diminish somewhat in strength with advancing years, which concurs with the opinions of Dr. Black and Dr. Kirk, implies, if it is correct, prime evidence that the question of tooth destruction by caries or otherwise is not always entirely due to external causes. For if there is sufficient vital connection between the teeth and the whole organism for the teeth to be affected similarly to other tissues with advancing age, then of necessity the possibility of change in those tissues from other than external causes is an indication that tooth destruction may be influenced by internal causes as well as external. The lack of ability of some teeth to resist external disturbances under the same conditions under which other teeth will resist them is, I suppose, what Dr. Talbot calls soft teeth, which seems to me a reasonable and explanatory term, so that I am quite prepared, while acknowledging the accuracy of Dr. Black's experiments, to argue with Dr. Talbot that there is such a thing as hard and soft teeth, comparatively speaking, and the hard teeth will usually resist destructive influences in their surroundings more readily than soft teeth. I also believe that the question of the best filling in various cases is of vital importance for the physical welfare of the patients.

Dr. E. H. BABCOCK, Brooklyn. I do not care to discuss the subject of the paper so much as I wish to consider the particular deductions from the practical standpoint.

All will probably admit that pathologically there are soft and hard teeth, but that seems to me to lie outside of the question; the main issue is whether there are hard and soft teeth physiologically. When Dr. Black made the statement that hard teeth and soft teeth do not exist, because both the so-called hard teeth and the so-called soft teeth are of the same chemical composition, I was unable to accept his deductions. I believe there is some factor which Dr. Black and the

other scientists have not yet discovered. Recalling your chemistry, you will remember that there are numerous substances of the same atomic composition that have exactly the same number of atoms, and yet by some difference in the arrangement of these atoms the whole substance itself is different. This is called isomerism. As an illustration, take diamond and graphite. These have, I believe, the same atomic composition, the same number of atoms, but there is a difference in the arrangement of the atoms, and we know that there is a difference in their physical condition. I believe that some similar consideration will aid us in clearing up the question of the difference between hard and soft teeth—I mean physiologically, not pathologically. We all appreciate the papers written by Dr. Talbot and Dr. Black, and although we may not be able to comprehend them from the scientific standpoint, we can all draw valuable lessons therefrom. In my opinion we as dental practitioners should be more careful in the treatment of patients, particularly in regard to interdental spaces. In the matter of filling materials the question of conductivity, either thermal or electrical, is very important. This brings us back to that new subdivision of dentistry, orthodontia. I think as the years go by we shall more and more appreciate the work of the orthodontist, who sees that the teeth are in proper position, and in so doing preserves the general health of the patient by preserving the interdental spaces and the proper relations of the teeth.

Dr. TALBOT (closing the discussion). I appreciate the manner in which my paper has been discussed from the scientific viewpoint. There are two points on which I wish to dwell for a moment. The first is with regard to Dr. Ottolengui's remarks as to his inability to understand the relation between healthy development and degeneration. Forty years ago I had a good deal of trouble to understand it, but now there are plenty of works which, if studied, will clear up all the points which I have brought out today, but these books treat on other subjects. I have no hesitancy in presenting

my views to this body, since there are many scientists with whom I agree and who agree with me. There are three works I would recommend especially, namely, De Moor of Holland on "Evolution by Atrophy," Bland Sutton on "Evolution and Disease," and Roux of Berlin on "The Struggle for Existence between Organs." In my work I give a list of books that every dentist should read, and these, together with my researches, will remove all difficulty in understanding the fundamental principles of all pathology of the head, face, jaws, and teeth.

Dr. Ottolengui gave some laws, but he left out one, the law of observation, and there is where we err. As dentists we do not observe. We are not trained along that line, and therefore we do not understand the etiology of irregularities of the teeth. We start with occlusion, which means nothing except from the mechanical viewpoint, but the causes are left out. The law of evolution is easily understood. I asked if Dr. Ottolengui had ever seen microcephaly and macrocephaly, both of the same type. The principle of development of the jaws and teeth is precisely like this: If you take the left arm, bind it to the side, and use the right arm continuously, the nutrition will go to the right arm and it will develop, while the left arm will atrophy. That is not a pathological condition by any means, but a physiological one. The reason why the lower jaw is larger in some cases and smaller in others is this: The upper jaw is stationary, and because of the peculiar structure of the different cavities and the different bones of the face the upper jaw does not move, and like the left arm above referred to, nourishment does not go to it. The upper jaw is not used, and the lower jaw (which represents the right arm) doing the work will finally receive more nourishment than the upper. When there is arrest of development of the lower jaw, which frequently occurs, there is less resistance to the tendency of the jaws to grow smaller. Anyone can understand why the human face is shorter than the snout of the camel or the cow; on account of disuse the human jaws are still growing smaller. The brain, the great nerve center, is develop-

ing at the expense of the face and jaws. This law of use and disuse is a simple proposition in development, and the foundation principle of all pathology of the head, face, nose, jaws, and teeth.

Dr. Darby's remarks were facts. It is true that teeth are soft as a result of scarlet fever or of any contagious and infectious disease in children; the soft condition is due to malnutrition. We often see men and women no more developed than a child should be at seven or eight years of age. I have seen instances where growth stopped entirely at seven years of age as the result of scarlet fever; in other cases growth may stop for two months or a year, and then finally develop. Such was the case with my own son, who had scarlet fever at eight years, and did not grow any more until he was seventeen years old. He is now six feet tall. That is an example of Dr. Darby's remarks. The rule has to work both ways. Soft teeth are due to faulty metabolism, and when that is corrected the nutritional process is corrected and the teeth immediately grow strong; but when a man reaches the age of forty, there may again be a change from overwork, mental breakdown, and in women from pregnancy, grief over the loss of children, etc., and the teeth lose in strength. Is that external? Not by any means; it is internal.

One gentleman spoke about the pulps. I made the point that the tooth-pulp may become senile at the ages of six, ten, thirty, or forty; that senile condition, which is the result of faulty metabolism, affects the pulp. The teeth which Dr. Latham and I examined were not decayed, but had fallen victim to other causes, such as interstitial gingivitis; these were immediately removed and placed in solutions prepared for the purpose. Upon examination the pulps were found to be diseased, showing conclusively that no external disease or condition of the salivary glands had affected them. The pulps being end-organs set in the teeth, and locked up in their cell, so to speak, and the blood carrying poisons to these extremities, these pathological conditions had set in.

(To be continued.)

NATIONAL DENTAL ASSOCIATION.

Thirteenth Annual Meeting, Birmingham, Ala., March 30 to April 2,
1909.

(Continued from page 1093.)

SECTION II: Operative Dentistry, Nomenclature, Literature, Dental Education, and Allied Subjects.

Chairman—W. G. EBERSOLE, Cleveland, Ohio.

Secretary—L. L. BARBER, Toledo, Ohio.

FIRST DAY—*Tuesday.*

THE first meeting of Section II was called to order on Tuesday afternoon, March 30th, at 2.30 o'clock, by the chairman, Dr. W. C. Ebersole, Cleveland, Ohio.

The first order of business was the reading of a paper by Dr. S. D. RUGGLES, Portsmouth, Ohio, entitled "Phases of Improvement in Nomenclature."

[This paper is printed in full at page 1153 of the present issue of the DENTAL COSMOS.]

Discussion.

Dr. M. L. RHEIN, New York, N. Y. This subject is one in regard to which I am of the opinion we all are in accord with the essayist, inasmuch as too little attention has been paid to it in the past, and too much attention cannot be given to it in the future. The question of how to reach a general conclusion in regard to some of these disputed points is hard to solve. For example, the essayist took occasion to emphasize his own preference for the use of the term proximal instead of approximal. For my part I could never give my assent to the use of this term, and I believe the reason given by the essayist to be not only a very poor one, but a very contrary one to the principle which he laid down in the first portion of his paper, where he states that terms should explicitly, as far as possible, represent exactly what they

state. Proximal, as has been so often said in public, simply refers to something near, while approximal definitely states a fact which we wish to state, *i.e.* an adjoining surface. I believe that the contention of Dr. White concerning this important word was correct, and I cannot understand why the addition of the two letters in approximal should make it lack in euphony.

I simply bring out this one point in order to show that many difficulties are presented at the present time in regard to the use of different terms. Outside of this particular term referred to by the essayist, I have nothing but words of commendation and approval for the subject-matter of the essay and for the desire there elicited. That is especially true in reference to the suggestion that the committee on essays in all societies should also be the committee on nomenclature. This suggestion seems a most excellent one, for many of the unfortunate errors in nomenclature that appear in print would be avoided, as this committee could eliminate these errors before an essay is published.

Dr. WM. A. LOVETT, Brewton, Ala. I should like to make a correction of one of the statements which have been made concerning the paucity of literature on the subject of the nomenclature of our profession. Several papers or essays published on this subject can certainly be found by searching the records of transactions of this associa-

tion. If I remember correctly, at the 1906 meeting of the association in Atlanta, Dr. George H. Wilson of Cleveland, Ohio, gave us a very able and lengthy paper on this topic, in which he presented a very full vocabulary of the different terms used in dentistry, their derivation and meaning, recommending in many instances such changes of words as would convey in an intelligent way the exact idea to be communicated by such terms.* I remember this paper very distinctly, because several of the words recommended attracted my attention, as, for instance, the word "substitute" for the word "dummy;" the essayist stated that while the former was a better term, it did not fully come up to requirements. Desiring to aid in the search for definite terms, it occurred to me that the term "dens-replica" would convey the exact idea. In studying the root and full meaning of the word "replica," I found that a substituted tooth would not be an exact reproduction of the lost organ of mastication.

I agree with the essayist that we should have a better system of nomenclature in our operative and prosthetic work. In medical nomenclature the terms used as a rule definitely describe the nature of the disease and its location; in surgery the names of the different operations describe accurately the nature of the operation and the part operated upon, while in chemistry the terminology employed in association with the chemical names gives us at a glance the formulæ of such preparations.

While this is true, dental surgeons as a rule do not comply strictly with medical and chemical nomenclature, as is evidenced by their prescription-writing. The profession is often brought into disrepute by reason of the poorly written prescriptions of its practitioners.

As far as dental nomenclature is concerned, every dental surgeon is in a measure a law unto himself, and one's failure to grasp a writer's or speaker's exact meaning sometimes may enhance in

the estimation of his readers or listeners his ability from the standpoint of education, while in truth he may be using newly coined words of his own making.

I am certainly in hearty accord with the essayist in his effort to establish a better system of nomenclature, and I agree with him as to the several recommendations made in his paper to that end. After we have secured this authentic change in dental nomenclature, we may hope that the profession will use the new vocabulary with more accuracy and greater freedom than it is now using medical, chemical, and surgical terms of known authenticity.

Dr. W. T. JACKMAN, Cleveland, Ohio. I am uncertain whether I understood the essayist correctly when he spoke of the words "cervical" and "gingival." I understood him to say that the word gingival is no longer used, and the word cervical has been substituted in its place. The word "cervix" means neck, and it is correct to use the term if we only wish to indicate the neck of the tooth, but what are we to use to indicate the gum margin? I should like to have the essayist answer that. If he can propose a better word than gingival to apply to the gum margin, I should like to know it, for I know no better word. I hardly think that we are ready to drop the word gingival.

Dr. RUGGLES (closing the discussion). In regard to the use of the words gingival and cervical, I do not wish to be misunderstood in saying that one has superseded the other entirely, because the two words apply to different conditions and should be used differently, but we should no longer speak of a gingival cavity when we mean a cervical cavity. There is a gingival line, the gingiva being a tissue at the cervical portion of the tooth, but we should not call a cavity at the cervical margin of the enamel a gingival cavity, as it is a cervical cavity.

A great many papers have no doubt been written on the subject of nomenclature, but to my knowledge very few such papers have been published in our journals. Dr. Lovett is correct in his remarks about a paper that was read at

* N. D. A. Trans. 1906, p. 164 *et seq.* Cosmos for May 1907, vol. xlix, pp. 456-65.

the Atlanta meeting of the National Association. I know of that paper, for I read it. But I have subscribed for the DENTAL COSMOS for twenty or thirty years past, and have spent considerable time in looking through the volumes for articles on nomenclature. The references to this subject which I found are but short, and I do not consider them properly papers on nomenclature. The principal papers have been read before this body, and they have been few indeed and were chiefly written by members of the committee in charge of that work. As to outside papers, I found one or two in the *Ohio Dental Journal* in the past ten years. This is a subject that has been consistently shunned, and before I had finished this paper I felt very much as if I should like to shun it myself. An essayist should be able to speak several languages to investigate this subject thoroughly, and should have many years to spend on his investigation. Dr. Black spent probably twelve or fifteen months on his original report to the Columbian Congress. The term which my friend Dr. Rhein finds fault with was submitted at that time and was practically accepted, but for some reason or other it has not been fully accepted by this association. At least one text-book—Black's *Anatomy*—has adopted the term, and I think others have done the same. It is much easier to say interproximal than it is to say interapproximal. If you will look up the origin of the word, it will not be difficult to convince you that the prefix could well be dispensed with, and the word will be easier for all to handle and it will serve every purpose. We all understand, of course, that Dr. Rhein is a New York man, and probably has a preference for the nomenclature used by the men in his neighborhood, but to my way of thinking, and I believe to a majority of dentists, Black's "Dental Anatomy" is a very good authority.

Gentlemen, I thank you for the courtesies extended to my paper.

The next order of business as announced by the chairman was the reading of a paper by Dr. W. T. JACKMAN, Cleve-

land, Ohio, entitled "The Elimination of Fear in the Practice of Dentistry."

[This paper is printed in full at page 1178 of the present issue of the DENTAL COSMOS.]

Discussion.

Dr. M. L. RHEIN, New York, N. Y. The paper to which we have just listened with so much interest, and almost needless to say with universal approbation, is especially to be commended. The elimination of fear rather than the elimination of pain is the title that the essayist has selected, and without giving his reason for doing so. It is therefore perhaps excusable that I should dwell a moment upon what I believe must have been his reason for choosing this title. It is hard to differentiate between the amount of physical pain and the purely imaginary pain on the part of the patient, which, as the essayist so well said, is brought about by fear. It is hard to estimate in what proportion of cases the latter is present, and we all should give more or less attention to that subject. The essayist has very well started out by dwelling upon the importance of handling this question skilfully, which is being given a great deal of consideration by the general medical profession at the present time. I have been coping with this question for twenty-five years or more, and I feel that if the patient can be induced to have absolute confidence in the operator a very great part of the battle is won. I have adopted for a great many years the plan of teaching my patients the value of absolute relaxation under operations of any kind. In order to induce patients to assume this attitude, it is essential that they have absolute confidence in everything that you may tell them; therefore you must never tell them anything that you cannot bear out in your practice, for to obtain the condition of relaxation is not an easy task, and the confidence on the part of the patient will not bring about results at the first trial. If you wish to succeed in compelling your patients to absolutely relax, it is essential that you continually call their attention to the fact that they are still

far from the point of complete relaxation; but after they have once reached that mental attitude, an almost incredible increase in their comfort is the result. I have known patients who did not begin to relax until after their eighth visit, the stages between partial to complete relaxation being very great.

I have dwelt upon this point at some length, because nothing in the way of general therapeutic agents begins to compare in my mind with the results obtainable from this procedure.

Besides generally commending this paper, I thoroughly agree with its main subject as far as it deals with the use of the high-pressure syringe. The use of this instrument has afforded me most satisfactory results. What I wish to criticize is that the essayist in my opinion has gone to extremes in both directions. He states at the beginning of his paper that no one ever seeks the dentist except when dire necessity compels him to do so. I would take very serious exception to that sentence, because, if this were true, I should be unwilling to continue practicing this specialty. The class of patients that the essayist's remark refers to is very insignificant, because, although patients may first come to us under such circumstances, it should be impossible for them to retain this attitude of mind after we have done our duty in enlightening them as to what dentistry means. The dentistry of today, and much more that of the future, does not mean reparative dentistry except in a few cases of necessity, but preventive dentistry. In this respect it is our duty to so enlighten our patients that they understand that the greatest work which the dentist has to do for them is to take such care of their mouths that they will not require any services that are painful at any time.

I wish to especially commend the essayist's allusion to the padding of the head-rest. For many years I have adopted this, and have found it to be of very great value. I also agree with the essayist's criticism of the Van Wyck freezing apparatus after a very careful trial of it. I consider it useless in the

dental office, although I admit that it would produce the desired results. It is similar to an infinitely superior agent that I introduced for this purpose twenty years ago, and it was only because of my inability to procure methyl chlorid that in the last few years I have abandoned its use. No other agent that I have ever used is as valuable as methyl chlorid, which within five seconds is capable of reducing the temperature to ten degrees below zero. I have used methyl chlorid for a number of years, when I was able to obtain it, without recording a single case of injury to the pulp. The advantage derived from this agent consisted in its instantaneous effect; it produced simply one shock, and then we had complete anesthesia of the parts to be operated upon, and that without any sign of anesthesia in the adjoining parts. It produced local anesthesia, complete and almost instantaneous, the duration of which was sufficient for all of our operations. There was no annoyance of waiting, nor any of the shortcomings as illustrated by the essayist in regard to the cold methods known at the present time. I have endeavored and hoped to induce the manufacturers to again place this article on the market, because I have felt its loss to be a very material one in my practice.

I also take very serious exception to what the essayist has said about cataphoresis. I have in my office today a cataphoric outfit that was first introduced to the dental profession by Dr. Gillett, and I have also had for a number of years the very admirable and accurate instrument introduced by Dr. Price. This instrument has never failed in my hands to produce the desired result, and whenever I hear of the junk-heaps made up of discarded cataphoric instruments I am simply convinced that the men who had those instruments were incapable of properly using them or were unwilling to follow out the suggestion offered in the essayist's paper that the time required is not to be considered in accomplishing such an important result. It is true that cataphoresis is not always possible, but the percentage of such cases

is so infinitely small that they are hardly to be taken into consideration. If I were to be compelled today to discard either the high-pressure syringe as spoken of by the essayist or my cataphoric outfit, I should prefer to retain the cataphoric outfit.

With the criticism of the essayist that it is impossible to insulate cavities I do not agree, as a general rule.

Dr. JACKMAN. I said difficult.

Dr. RHEIN. If this insulation is difficult, then it only belongs to the same class as many other operations that we perform. We say continually that it is difficult to put in good gold fillings, but that is no excuse for a practitioner not improving his technique. In the same way there is no excuse for a practitioner not learning how to properly insulate a cavity. I am willing to admit that in certain teeth that contain fillings, cataphoresis is not indicated under certain conditions, because of the possibility of the current passing through the metallic fillings, thus failing to reach the desired point; but aside from such a condition, I know of no cavity in which proper insulation is not possible, if the technique is properly understood and carefully executed.

Although I have taken considerable time in discussing this subject, I would not close without calling the attention of my *confrères* to the fact that we occupy a unique position, inasmuch as we claim to have first introduced the benefits of general anesthesia by means of nitrous oxid, and yet today we find ourselves in the lamentable position of being subject to the criticism of the medical world because our work is so much dreaded and feared by patients.

There is just one other point that is very germane to this subject. I have known of operators who, being filled with that sympathy which all of us more or less have and should have for our patients, have permitted themselves to perform dental operations that do not reflect their own capabilities and are lacking in the accurateness of operative procedure, and who have allowed their patients to pass through their hands with

imperfect operations that are bound to be a failure, because of the operator's desire to accomplish the work without inflicting pain. That is an undesirable feature of painless operations which must be condemned as much as every other effort in the direction of humane dentistry is to be commended.

Dr. J. Y. CRAWFORD, Nashville, Tenn. I am very much pleased to appear before you today to discuss this very interesting paper on such an interesting subject.

As to Dr. Rhein's suggestion regarding anesthesia, I do not wish to criticize him, but I simply wish to make a little explanation that I think is due. Dental surgery did not discover nitrous oxid, chloroform, or ether; it simply contributed to the medical world and to humanity the application of surgical anesthesia. That is all that is claimed. We contributed to the world anesthesia, but not anesthetics. When it came to naming this condition, Oliver Wendell Holmes gave us that beautiful, that splendid word, that has perhaps conveyed more comfort to the human family than any other word in our language—anesthesia.

This subject is one of the biggest in dental surgery. I have nothing to offer in the way of criticism as far as the essayist's technique is concerned. In pressure anesthesia as applied to dentin I have very little practical experience. I have tried to apply it a few times, but I did not succeed well enough to warrant continuing my efforts. As to cataphoresis, if you will go back in our literature you will find that the practical idea of the cataphoric instruments was suggested by Dr. Flagg of Philadelphia, in that series of articles on differential diagnosis of the various conditions of the teeth giving rise to pain, in which he suggested a definite treatment for pericementitis by the use of electricity in carrying medicines into the tissues. About that time the observation was made by a gentleman in Mississippi, now a resident of Tennessee, that when medicines are applied by connecting the positive pole of the electric battery on one side and the negative pole on the other, the acids go in one direction and the al-

kalis in another. That was the first practical suggestion of the *modus operandi* by which medicines could be induced to penetrate the structure of the teeth by cataphoresis. Like my friend Dr. Jackman, I bought one of the first instruments of this character, paying one hundred and thirty-five dollars for it, but I gave it away, not without feeling, however, that there was something in it. I did not feel justified in condemning the instrument simply because I could not accomplish the feat of complete insulation, but I attributed my failure to my faulty technique.

Mr. Chairman and gentlemen, if the essayist will excuse me, I would say something definite which may be worth more than all I may say during this meeting, and perhaps during the balance of my life. There is a theory in philosophy which teaches that if a principle is false in one feature, it is false in all. If in our theory we have one faulty feature we have laid down a bad principle, and if we allow ourselves to be governed by it the whole fabric will be faulty. The subject of dentin has been under consideration this evening almost exclusively. If I were to ask the men in this audience to stand up who believe that normal human dentin is sensitive to cutting, what per cent. would rise? Perhaps two or three. Yet there is a misconception. Everybody tells you that the dentist should be an anatomist and a physiologist, and should understand pathology. And here we are talking about the dentin being sensitive. The dentin is not sensitive to cutting unless it is in a diseased, abnormal condition. There is something wrong if, when we attempt to remove the enamel in a tooth that has no cavity, the patient jumps when we touch it; the dentin in that tooth is not normal. With a proper insight into the physiology and the pathology of these conditions, we shall understand that when a tooth is slightly sensitive it is slightly abnormal, no matter whether that sensitiveness arises from a constitutional or a local cause. Somebody will say that sensitiveness is due to an irritation of the pulp. Yet you can take a

tooth with a large cavity, decayed to such an extent that the pulp is exposed, and as a result of that exposure the pulp may be injured, and yet on removing the decay you will find that there is no sensation at all in the dentin; you may cut *ad libitum* in any direction, anywhere inside of the enamel shell, and inflict no pain. If there is any pain in preparing the cavity, you can with medication restore the dentin to a normal condition by one or two treatments, and then cut it without any pain whatever. This is capable of demonstration, and it proves what? That normal human dentin is not sensitive to cutting.

Someone is ready to say, How many people did you ever see that had normal teeth? The first time that I was asked that question I replied: How many people did you ever see that did not have decayed teeth in their mouths? The fact that ninety-five per cent. of the people you see have decayed teeth in their mouths does not indicate that such a condition is normal. It is strange that practically the same percentage of people who have decayed teeth have intensely sensitive teeth, and in proportion as the teeth decay rapidly, they are also sensitive. If the dentin is brought back to a normal condition, we can go along with our cutting, and reduce the painfulness of dental operations. In treating a large buccal cavity in a molar that is sound otherwise, you can put on the rubber dam, scrape off the superficial portion of the decay, dip some cotton on a piece of orange-wood into a four per cent. solution of cocain and apply that to the dentin, and you will find that the sensitiveness has disappeared. That illustrates a principle. I am not advocating that procedure, but I am trying to impress on your minds that by bringing the hypersensitive structure which causes so much pain under the influence of the anesthetic, we shall have a perfectly normal tooth.

Dr. Rhein referred to complete relaxation as a means of affording relief. Yet you may take two persons of the same age, the same temperament, and the same amount of caries, and if possible with

the same sensitiveness of dentin; you may put one of these patients in the chair and tell him that you wish him to perfectly relax, and to concentrate his mind on something outside of what you are doing, or to look intently at some object which you indicate, but the moment you touch his tooth he will close his eyes. You may repeat that four or five times, and he will insist on closing his eyes every time you touch a tooth. You may give the other patient the same instructions, and when he closes his eyes he will fall asleep. In the first patient you may use all the cataphoric instruments you wish, and you may pump all the cocain into his teeth that the dentinal tubuli will hold, and he will continue to the last to keep wide awake. This illustrates the proposition that I first mentioned, namely, that cataphoresis will not affect some people in the same way as it does others, and as I said, a principle that is false in one respect is false in all others.

Dr. W. G. EBERSOLE, Cleveland, Ohio. Dr. Jackman is a very conservative man and one not given to rushing into fads and fancies, but if he is once convinced that a method is proper for both patient and operator, he becomes an enthusiastic advocate of that method.

The doctor has given us a very excellent and yet a very conservative paper. Filled as I am with this subject, I am free to say that it would be impossible for me to present so conservative a paper. And yet to many, no doubt, this paper seems a radical one. To these men let me say that every thought expressed by the essayist is a truth, and every fact stated can be demonstrated beyond the doubts of the most skeptical, if they will but place themselves in a receptive mood and investigate thoroughly the work that Dr. Jackman and others who are following this method are capable of producing.

The essayist says that nearly all pain could be wholly averted if proper and available means were used. With the means at our command at the present time, it is possible to perform practically every dental operation without inflicting any actual pain. It is possible by

the use of both general and local anesthetics to eliminate *all* pain from dental operations, but while this is possible, most men find it impractical to use the major general anesthetics. Much is therefore to be accomplished in humanitarian methods before every man in the profession may do practically painless work.

The essayist also made this statement: "We have come to the time when cavity preparation may, with only an occasional exception, be made without pain." In regard to this statement, I would say that it is possible to prepare all sensitive cavities absolutely without pain, if the operator will but take the time, and use suitable anesthetics applied by a proper apparatus. It is impossible to describe here all the methods and means at our command which are necessary to enable one to perform painless operations.

The essayist spoke of the feather pillow for the head-rest. This is a very valuable addition to the comfort of our patients and helps to allay the fear of the hard head-rests. Some years ago Dr. Jackman called my attention to these pillows, and since using them I have had few complaints about my head-rest hurting the patient.

In regard to the Van Wyck-Kerr obtunder, I thoroughly agree with the essayist that no man can use an apparatus of this kind and prepare a cavity thoroughly while any moisture is present.

Cataphoresis, as the essayist states, has created quite a furor, and if properly handled it is a great boon to humanity. I use it almost as frequently as I do the high-pressure syringe.

In many sensitive cavities in the anterior teeth, particularly in small interproximal cavities, cataphoresis is the only satisfactory method of obtunding, unless you are willing either to cut away more tooth-substance than you are justified in sacrificing, or to make an extra cavity which cannot be included in the original cavity, both of which to my mind are poor practice.

If you attempt to obtund the teeth with a high-pressure syringe, you are compelled to enlarge some cavities beyond all necessity; with a cataphoric ma-

chine it matters but little how small the cavity is, it can be successfully and thoroughly anesthetized without unnecessary loss of tooth structure. In fact, there are many cases other than this in which I prefer to use cataphoresis instead of the high-pressure syringe.

If there are a number of cavities in a set of teeth, particularly if they are on different sides of the mouth, I many times open up a cavity on one side and start cataphoresis while I am opening up a cavity on the other side, and by the time I have reached a sensitive portion of that cavity the first one is in such a condition that I can transfer the cataphoric machine to the other side of the mouth while I prepare the anesthetized tooth.

In this way I am able to save time, and I have perfected the system of insulation so that I very rarely indeed have any trouble with the current leaking around the teeth or through a metallic filling in the teeth.

In regard to the use of the high pressure syringe, the essayist says, "Few dentists, apparently, have had the patience and determination to master this instrument, but when this mastery is once acquired there is no instrument in the dentist's armamentarium of so much value as this, the proper use of which will turn the patient's mourning into joy and will relieve you of much nervous strain—consequently you will be less tired at the day's end."

It is really astonishing how few men have been able to successfully handle this instrument. Some of the best operators in our country have failed owing to lack of patience, as Dr. Jackman says; to which I may add, in many cases owing to lack of common sense.

Not long ago one of the leading dental pathologists of this country took occasion to severely condemn the use of the high-pressure syringe, stating that he had never seen a case in which high pressure had been used in which the pulp did not die within six months. This man was of such high standing and reputation that his statement was calculated to do much damage to the cause of humanitarian dentistry.

Being at that time editor of the Humanitarian department of the *Dentists' Magazine*, it became my duty to reply to this statement. Upon investigation, it was found that this statement was made after the writer had used the high-pressure syringe in five or six cases, in which he had pumped a cocain solution into the tooth for a period of five or six minutes, without giving any heed as to whether or not he had obtunded the dentin. In other words, his method of procedure was about as rational as it would be for a physician to take up a large syringe loaded with strychnin and pump it into the patient until the patient's life was entirely extinguished.

This operator had simply pumped cocain solution into the tooth until he had thoroughly strangled the pulp, and upon the application of such a technique he stood ready to condemn one of the greatest boons ever brought to suffering humanity.

As Dr. Jackman says, it is not the fault of the method, but rather the failure to carry out the prescribed technique, which causes both failure to anesthetize and injury from hyper-anesthesia.

Of the technique described by Dr. Jackman, I have not much to say, for it differs very little from that employed by most men who use the high-pressure syringe successfully.

Relative to the application of a five per cent. aqueous solution of cocain to the gums prior to applying the rubber, I would say that for eleven years or more I have followed that procedure, and rare indeed it is that I find a patient who is afraid to have the rubber applied the second time. In many cases I have seen a patient fairly unnerved by the time the rubber was placed in the old-fashioned way.

I am very glad indeed that Dr. Jackman referred to the fact that it is unnecessary to drill through the enamel before applying high pressure. It was first thought that it was absolutely necessary to drill entirely through the enamel before high pressure could be used.

Some three years ago, I made the statement to some of my friends that it

is unnecessary to penetrate the layer of enamel before using high pressure, saying that I was able to force the solution through between the enamel rods, and thus prevent any pain in making the initial pit. These men had been most successful in the use of high-pressure anesthesia. Some of them laughed at me and told me that I was wrong, the essayist being among them.

I made the first public statement of this kind before the Odontological Society of Eastern Pennsylvania, in Pittsburgh, November 12, 1907. Six months ago I stated before the Institute of Stomatology of New York city that it is possible to obtund sensitive dentin in a sound tooth without making any opening in the enamel by simply taking a heavy rubber dam, ligating it very tightly around the neck of the tooth and also around the nozzle of the large syringe, and then ballooning the rubber with a cocain solution, allowing the constant pressure of the rubber to compel the absorption of the solution through the unbroken enamel. To accomplish much by this method, however, it is necessary to have the patient under observation for a number of hours.

Dr. Jackman also refers to the fact that it is not always possible to secure perfect contact. The decided difficulty experienced in many cases of this nature may be overcome by placing a few fibers of absorbent cotton over the needle point before inserting the syringe into the cavity. The cotton then acts as a sort of packing around the piston and prevents the escape of the fluid.

To prevent overdosage I prepare that portion of the cavity which is the most remote from the point of injection, and when that can be done without sensitiveness, there is absolutely no necessity of carrying the anesthetic beyond that point, and there will never be any loss of pulp due to high-pressure anesthesia.

In corroboration of what Dr. Jackman says in his paper in regard to the loss of the pulp, I would say that this is a very rare occurrence in my practice in a tooth which I have prepared by either cataphoresis or high-pressure anesthesia.

Dr. Jackman makes the statement that high pressure should never be used in a carious cavity, for two reasons—(a) because the mouth of the dental tubuli is filled with débris, and (b) if you do succeed in desensitizing the dentin you probably force ptomaines into it, which will almost surely cause the loss of the pulp.

While it is better many times not to make the initial pit in the cavity, there are many cases in which I make that pit in the cavity, especially if the cavities are at the gingival margins of the labial or the buccal surfaces of the teeth. I have absolutely no hesitancy in making the pit there. In many cavities that were so sensitive that I could not make the initial pit without causing pain, I have set the point of the needle firmly into the carious portion and have forced the anesthetic through it sufficiently to allow me to make the pit painlessly; then proceed as if I had made the initial pit outside of the original cavity. I have followed this procedure many times, and have yet to find a case in which any signs of disturbance followed.

Dr. H. H. JOHNSON, Macon, Ga. There are two sides in our profession, the practical and the theoretical. My position in life and my position in my profession have made it necessary to follow some theory and make a practical application of it, therefore I have studied the practical side from every standpoint and have endeavored to apply it accordingly. There are two sources of suffering in our patients, the mental or imaginary and the actual pain. The subject of anesthesia is a very important one, but in the application of it the fact must not be lost sight of that mental suffering may be increased and intensified unnecessarily by an endeavor to produce anesthesia under adverse conditions. That was the trouble with the application of cataphoresis. Cataphoresis would accomplish the desired purpose, that is, produce anesthesia, but for the very reasons cited above it was impractical. The high-pressure syringe can be made to accomplish that which Dr. Jackman claims for it, but in a majority of cases the use

of cataphoresis or the application of the high-pressure syringe will intensify the mental suffering, leaving the patient exhausted to a much greater degree than is occasioned by an expeditious and careful operation conducted without their use. If we study the temperaments of our patients and try to instil confidence in them; if they find that we are endeavoring by every reasonable and practical method to avoid prolonging the operation and inflicting unnecessary pain, they relax, and their mental suffering is diminished. If we use sharp instruments which do not revolve too fast, keeping in mind the fact that fast-revolving instruments produce heat and consequently pain, and if we take into consideration that a bur may be clogged with drill-dust and become a burnisher instead of a bur, and that by cleaning the drill-dust from the blades and revolving the bur slowly the amount of heat is decreased, we will find that sensitive dentin can be cut comparatively painlessly. Just as long as the operation is unfinished, just so long will the dread and apprehension remain with the patient, it matters not how much assurance may be given him.

I have used cataphoresis. I bought three or four machines at a cost of several hundred dollars, but I found them impractical, not because they did not produce anesthesia, but because they exhausted my patients by increasing the nervous apprehension. I have anesthetized teeth and have excavated cavities painlessly, and yet the patient would leave the chair absolutely exhausted. When you string a lot of wires about the room and chair and begin to bind something to the patient's head or cheek, it gives him the idea that he is to be electrocuted, and in consequence his mental suffering continues until the operation is finished. Expeditious operating, if carefully done, is more practical than any of our prolonged methods of anesthesia. On the other hand, if we wish to produce local anesthesia, why not make an injection in the tissues near the apical foramen. This can be done quickly and with little nervous apprehension. These dangerous looking instruments—like

pistols and extracting forceps—when brought in front of the patient cause him shock and mental pain—the very object for which they were intended, the relief of suffering, being defeated by their pretentious appearance.

Dr. A. P. BURKHART, Buffalo, N. Y. This subject is certainly one which should interest every practitioner, regardless of his age or experience in the profession. As I grow older and come in contact with patients day by day, instead of growing rough and indifferent to their feelings I grow more tender, and I find that my attitude is appreciated by both male and female.

Like the speakers who have preceded me, I have spent a great deal of money for various appliances that have been brought to the attention of the profession, yet I never have regretted a single dime that I have spent in that direction, because I recognize that it takes time and experience and money to bring about the very best results. I have used cataphoresis, pressure anesthesia, the cold process, and I am frank to say that pressure anesthesia and the cold process, or the Van Wyck process, have given me the greatest satisfaction. I can say without fear of successful contradiction that with the Van Wyck process, for instance, I can expose the pulp of a molar without causing any pain to my patient, and obtain results which I have not been able to accomplish with other processes. With the Van Wyck process, which in a measure has been condemned by the essayist and by one or two of the previous speakers, I can make a certain sort of crown and bridge work for my patient painlessly, or almost so, which I cannot do by any other known process. I am not able to demonstrate this to you, but in the clinic which I shall give I will show you the particular sort of bridge work which I have in mind.

I consider it the duty of every practitioner to make all operations painless as nearly as it is possible to make them so. One operator may become proficient with ordinary pressure anesthesia and accomplish wonderful results, another with the Van Wyck process, another with cata-

phoresis—all of which are useful and a boon to humanity.

Many operators have perhaps overlooked the proper adjusting of the rubber dam to the tender gums surrounding the neck of the tooth. In many cases the dam is adjusted without any regard for the feelings of the patient. In every case the gums should be carefully treated, as the essayist has advocated. There is no doubt that the patients' mental attitude is a great factor in our work, and that confidence on their part is very important and necessary. If you can say to your patient, "I can positively assure you that this operation will be performed with scarcely any pain, because I have performed it in that manner time and again," you will gain his confidence, which will aid you in avoiding pain in your operations.

The importance of confidence becomes especially apparent in the administration of nitrous oxid. The patient is seated in the chair, he is frightened, and his heart's action is abnormally rapid, and if the gas is turned on at once, uniformly good results cannot be obtained. That is the wrong way of gaining the patient's confidence or of obtaining the best results from this particular anesthetic. Seat the patient in the chair, then adjust the face-piece, tell him that there is not a particle of gas in the tube or hood, and explain to him how you wish him to breathe, and before you know it the patient will be breathing naturally. He is relaxed, as Dr. Rhein says, and his heart's action is normal. Then turn on the gas, and you will never realize any bad results, and secure a better effect than you would by the rapid method which is too frequently indulged in at the present time.

Dr. W. H. DEFORD, Des Moines, Iowa. There are three methods of eliminating pain, one by means of a general anesthetic, another by local anesthesia, and the third by suggestion. In the matter of eliminating pain you must begin first with the dentist, not the patient.

Many dentists are timid about using local anesthetics, many more are afraid of general anesthetics, and but few un-

derstand the application of suggestive therapeutics. Consequently more unnecessary pain is inflicted daily by the dentist than by all other medical specialists combined. "Humanitarian dentistry" can never make very much progress till dentists become masters of themselves, and learn to operate with as much assurance when employing anesthetics as they now do without the aid of anesthetics.

Dr. Jackman has shown conclusively that about ninety per cent. of all dental operations can be rendered painless, and boldly states that he would relinquish the practice of dentistry rather than practice without the aid of anesthetics. If Dr. Jackman can operate painlessly other practitioners can do the same, and it is a duty that we owe to those who intrust themselves to our care that we should avail ourselves of these methods.

While I commend all that the essayist has said, and am in hearty accord with the chairman of this section, Dr. Ebersole, who for so many years has emphasized the importance of this subject every month in the *Dentist's Magazine*, I have gone a step farther, and have been raising my voice and doing all I could to show members of the dental profession the advantages of performing all dental operations in a condition of anesthesia by means of such general anesthetics as nitrous oxid and oxygen, ethyl chlorid, and somnoform.

By the aid of general anesthetics everything can be accomplished in the way of eliminating pain that Dr. Jackman has mentioned, and in addition all those painful conditions can be coped with which cannot be overcome by the use of cocain.

A patient presents who has been suffering all night, walking the floor in agony, waiting for the light of day, nervous, trembling, and white with fear. Examination reveals a case of pulpitis; it becomes necessary to remove quite a depth of soft, stringy, leathery, semi-decayed dentin, and at every touch of an instrument excruciating pain results. This is always augmented by mental suffering lest the instrument should en-

ter the pulp, and cocain is not readily absorbed in such cases. Just a few whiffs of one of the general anesthetics referred to and in thirty seconds of time you can enter the tooth, deplete the pulp, making it ready for an emollient treatment, or remove it completely.

Last May, at the annual meeting of the Nebraska State Dental Society at Omaha, Dr. Frank Hetrick called me to assist him. He was preparing two cavities in approximal central incisors for fillings. These had become so sensitive that the patient could not endure the cutting. I administered three inhalations of somnoform twice, and in less than two minutes these cavities were properly prepared. This patient, a dentist living at Lincoln, told me afterward that never in his life before had anyone been able to make a proper cavity preparation for him, and at the annual meeting a year previously he sat with the rubber dam on a molar for four hours and only a cavity sufficient to hold cement could be prepared by all methods except general anesthetics. He experienced no pain under the somnoform analgesia, and at no time lost consciousness.

In cases of pericementitis bordering on alveolar abscess, in alveolar abscess where it becomes necessary to enter the pulp-chamber, and especially if a filling must be removed, or in those cases where a pulp has died under a gold crown or a bridge abutment—the most painful operations and the most trying for the patient—cocain is of no value whatever, while a few whiffs of nitrous oxid and oxygen or somnoform render these otherwise long and tedious operations brief and painless.

Two weeks ago, at the clinic of the Des Moines District Dental Society, I saw Dr. Fred Hunt administer nitrous oxid and oxygen, and in two minutes and thirty seconds remove painlessly the pulps of five anterior teeth.

I wish to thank Dr Jackman for calling attention to this subject, and put myself on record as favoring any methods that have for their object the relief of pain in dental operations.

Dr. JACKMAN (closing the discussion).

In the first place, I wish to thank the gentlemen for the discussion of my paper, in the course of which nearly all phases of operative procedure were touched upon.

In regard to Dr. Rhein's remarks, I believe, of course, in winning the confidence of the patient, but I do not know of any way that is half as good and takes as little time as the use of the high-pressure syringe. Take the patient mentioned in the paper, or anyone of that character, no matter how fearful she may be, I can generally gain her confidence in but a few minutes by proceeding with the operation in the manner suggested in the paper, and when she comes back the next time she simply relaxes, because she knows from previous experience that she will not be hurt. After you have thus won the patient's confidence, she will ever be your friend, providing you do first-class dental work. The old way of obtaining the patient's confidence by inducing her to relax by thinking about something else, looking out of the window, etc., has its place and is of some use, but we have far better methods than that. In three or four minutes you can have the patient's confidence, and you do not have to go through the same procedure every time she comes to your office.

I spoke of the patient coming to the dentist only driven by sheer necessity, and I think that is true. Of course, as Dr. Rhein suggests, we should teach patients the benefits of oral hygiene to such an extent that there will be little or no need for large painful operations, but that is largely missionary work, and we are far, very far from such an ideal now. We have to meet conditions as we find them. We are finding cavities in teeth, and we have to fill them. Of course I teach my patients to take care of their teeth, and I hope that the day will come when we shall not find so many carious teeth; but I should like to know how many patients come to Dr. Rhein or any other dentist before there is any necessity for dental operations? Very few indeed, I assure you. Dr. Rhein spoke of methyl chlorid, but the shock that he speaks of seems undesirable to

me. When the shock is over, of course one can go on with the work painlessly, but I think we can employ better methods than that.

Dr. Rhein spoke of the Gillett cataphoric apparatus. There were a few men in my city who used this apparatus for a time and did good work with it, but most of the machines were defective. I do not use cataphoresis. I have an apparatus that cost me one hundred and thirty-five dollars, but I have not used it more than two or three times since I began using the high-pressure syringe.

I said in the paper that time was not to be considered in gaining the confidence of the patient, but in using cataphoresis several minutes and sometimes hours are consumed in desensitizing the tissues, and then when we begin to work on the tooth the tissues may not be desensitized deeply enough, and we have to go all over the same procedure again, thus unnecessarily consuming a great deal of the patient's time, which may be worth more than our own. This is eliminated by the high-pressure syringe; a second application may be necessary for a minute or two only, to again desensitize the tissues.

I disagree with my friend Dr. Ebersole in the use of this instrument. I do not believe in making useless cavities, but when I find cases in which I cannot reach good sound dentin at the cavity margin I do not hesitate to make a little cavity on the buccal or lingual side of the tooth, and inject into the dentin from that point. How easy it is to fill a cavity not larger than a pinhead and in a location where a filling will last just as well as if there had been no cavity. The results being so satisfactory, I do not see any objection to that procedure at all. Personally, I encounter trouble in trying to use this method in the cavity; I therefore apply it only in healthy dentin.

As to Dr. Crawford's remarks, I thought the time gone by when anybody would maintain that healthy dentin is not painfully sensitive. If I am correctly informed, the latest teachings of Black, Williams, and others is that the contents of the dentinal tubuli, while

they are not organized like nerves proper, yet exhibit symptoms of the presence of nervous sensation.

Dr. CRAWFORD. What is that sensation—is it ductile or sensory?

Dr. JACKMAN. It is sensory. When grinding a normal tooth for a bridge we find almost invariably that the tooth becomes very sensitive as soon as the dentin is reached. I am aware that the theory has of late been advanced that this sensation is ductile, but I believe this to be theory only, without proof.

The high-pressure syringe will desensitize a tooth without the patient experiencing pain. Dr. Crawford told you that normal healthy dentin is not painfully sensitive, but that of course has nothing to do with the paper. We have to meet the conditions as we find them, and when a patient comes to you complaining, you have to deal with a pathological condition.

I am surprised that Dr. Johnson should have spoken as he did. I do not see how he can in any sense feel justified in hurting his patients. He spoke of scaring the patient with the instrument. One of the first things I do is to show the instrument to the patient and explain to him its purpose; that usually removes all fear.

Section II then adjourned until a later session.

WEDNESDAY—*Second Session.*

The second session of Section II was called to order by the chairman, Dr. W. G. Ebersole, Cleveland, Ohio, at 3.30 p.m., Wednesday, March 31st.

The first order of business was the reading of a paper by Dr. G. S. VANN, Gadsden, Ala., entitled "Dental Science a Part of Universal Literature."

[This paper is printed in full at page 1169 of the present issue of the DENTAL COSMOS.]

Discussion.

Dr. F. L. HUNT, Asheville, N. C. You will all agree with me that Dr. Vann has presented to us an extremely interest-

ing paper on a most difficult subject. Most of us could write possibly on some subject pertaining more especially to dentistry, but when it comes to writing on such a subject as Dr. Vann has selected, we should hardly be prepared.

The essayist has so fully covered this subject, in my opinion, as to leave but little to be said by way of discussion. Following the line of thought as suggested by the paper, I am very glad indeed that Dr. Vann's paper will be recorded in our literature. The essayist takes us out of our everyday work and carries us into the poetry of living; he shows that the members of our profession have built literary monuments, which will reflect credit upon the writers individually and upon our profession. These works will endure for all time; they will aid us in carrying out our greater plan of living by appealing to our mentality and instructing us so that we are better prepared to bring about that physical harmony so essential to our highest type of living. While the skilled operator deserves the greatest credit for his work, it does not compare at all with the work done by these great authors, whose writings have inspired our operators of ability. I am inclined, however, to think that the essayist has placed our works on dentistry on rather too high a plane from the purely literary point of view. A purely literary production is generally conceded to be interesting to many classes of readers, while our works on dentistry are interesting to dentists especially, because they teach principles and facts inherent to dentistry. Notwithstanding this, the highest credit and honor is due to our writers in dentistry.

In this connection might be mentioned the attitude of our teachers in the colleges at the present time. At one time I expected to write a paper on the subject of dental education, and to that end I wrote to the deans of our dental colleges in the United States and Canada, among other questions asking for information as to the educational requirements for admission, the graduation requirements, and their opinion of the

present preliminary educational requirements. I wish to thank these gentlemen very heartily for their interesting replies, and I hope in the future to be able to use the information which they gave me. Nearly all of them made a plea for higher educational requirements, believing that to be essential to enable the students to become most proficient and to reflect the greatest credit upon themselves and their profession. To these teachers, also, high credit is due for the very excellent work which they are doing toward lifting up the dental education of today.

Dr. J. Y. CRAWFORD, Nashville, Tenn. I cannot possibly forego the pleasure of giving my high commendation to this excellent paper. I was strongly impressed with the timely *morale* of the paper in its general scope, and particularly with one portion of it, where the essayist referred to some of the living contributors to our splendid literature. Not all of us have had the advantages of the younger men in regard to literary preparation. I would therefore make a most earnest appeal to the young men in the profession to go to the archives of the world, and particularly to those of this great country, whose shelves contain monuments that will last longer than any memorials that may be erected by hands. Make it a rule every day of your life to write down some fact, some truth, however short, that will be a contribution to the volumes of our literature, because on that we depend for the perpetuation of the reputability and honorable history of our profession.

Cultivate your memory and compare your thoughts with those of the writers of the present and the past, and try to contribute to the literature of your profession truths that will last forever.

Dr. G. V. BLACK, Chicago, Ill. I did not expect to partake in the discussion of this paper, which I consider to be especially opportune and befitting the time and place (if I may bar what has been said about myself), and one that is very much needed. Without wishing to censure, it is commonly said that the dental profession is not a reading pro-

fession, and I have been looking forward to the time when the stimulation of the reading habit would become characteristic of the profession. This paper has that aim; we should stimulate the young men of our profession to read more and to write more. Especially do we badly need more good English writing in dentistry.

It should be the first object of every young dentist, no matter what his preliminary education may have been, to master as well as possible the English language both in writing and speaking. You may not have had great advantages in your early training, but do not let that deter you. Lincoln had no advantages in early training, but he became one of the greatest masters of English. After that, if you can, make yourselves master of one or two of the modern languages. A review of the old French writers on dentistry affords a wonderful insight into the history of dentistry. They are among the very best writers from the literary standpoint. A review of the German will also be of great benefit. These writers are wonderful aids in the mastery of what has gone before. That informa-

tion every man should gain for himself. If I may be allowed to allude to myself for a moment, which I seldom do, I would say to these young men here who may not have had excellent advantages in early training, that I had none. Two or three months in the common country school in the winter for five or six years was all. What else I have done I have accomplished since, and you can do the same, if you work with a will. There is no reason why many of you should not do just as much and perhaps more than I have done, for the time in which you live is better and is more stimulating; there is more to be done, there is more insight to be gained in dentistry now than ever before.

Dr. VANN (closing the discussion). I am very grateful to the association for the kind reception accorded my paper, and for the liberal discussion of it. I have set forth my views as clearly as I could, and I have nothing else to add, except to express my appreciation of the honor conferred upon me in being requested to prepare a paper on this subject.

• (To be continued.)

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PHILADELPHIA, OCTOBER 1909.

EDITORIAL DEPARTMENT.

THE DENTAL INSPECTION OF PUBLIC SCHOOL CHILDREN.

INTEREST in the care of the health of public school children is a growing factor among the varied activities which have for their purpose the conservation of the public health in general. A generation ago those concerned with the problems of public education considered any question of child health other than the more obvious rules of hygiene as outside their range of responsibilities. Today the health of school children, in mass and as individuals, is the subject of paramount consideration by educational authorities. This change in attitude is the direct outgrowth of the scientific study of child development in relation to educational methods which has been actively in progress for many years and which has engaged the attention of the most able thinkers the world over. The major result thus far attained has been to enforce upon public attention the fundamental fact that, broadly speaking, a sound mind can only be developed in a sound

body, and its corollary that normal progress in education can only take place in a healthy organism. The care of the health of school children, who are the wards of the state from an educational standpoint, is not merely nor mainly a humanitarian question, much less is it a question of public charity. It is an economic question of the first magnitude. It has been well said by a writer on the care of the teeth of public school children in England that "The child's health, mental and physical, is a national asset, which it is the duty of the state to preserve and foster." It is the recognition of this fact which should operate most efficiently in securing the adoption of salutary means for improving the physical condition of those of the rising generation upon whom the duties of citizenship must subsequently fall.

In the earlier phases of the movement, now general, toward improving the physical condition of school children, the appeal for legislative assistance and furtherance has too often been made upon humanitarian and charitable grounds. The plea as made from this standpoint has been only partially successful. State legislatures are heavily taxed in supporting public charities dealing with the care of the obviously dependent; the drain upon public resources for institutions of a strictly eleemosynary grade is a heavy one, and as a consequence legislative bodies are, in most instances, compelled to limit their benefactions to institutions and charities dealing with the manifestly dependent classes. Hence from the charitable standpoint the direct intervention of the state in the matter of the care of the physical ills of public school children is more difficult to secure than it is in the case of the absolutely dependent and in many respects relatively less important class of its citizens.

Public opinion is, however, undergoing a rapid change of attitude with respect to the importance of this department of educational work. The necessity for state and municipal aid in securing better health conditions among public school children is being more sympathetically recognized by the public at large than heretofore. There is less show of resentment upon the part of intelligent citizens than formerly at what was once regarded as an unwarranted extension of paternalism upon the part of state and municipal authorities when efforts having for their object the physical improvement of school children were put into practical

operation. All of this result is the natural outcome of the general campaign of education leading to better health conditions which in its various expressions has occupied so much of public attention for the past decade. But the dental aspect of the subject has only recently begun to command serious attention, in America at least, and much yet remains to be done before public school children in America can be efficiently protected from the disabilities directly caused by preventable oral and dental lesions from which a large percentage of them suffer. Other nations are ahead of us in this important department of public professional service. It is to our discredit that, in spite of our boasted supremacy in dental matters, we as American dentists have done relatively so little in this direction. Great Britain and Europe have for years been actively at work in securing the benefits of dental attention for their public school children. The co-operation of the medical profession and of municipal authorities has been secured, and the representative dental societies have systematically undertaken the work of inspection of school children's mouths and put into effective operation satisfactory means of treatment. The percentage of unclean and unsanitary mouths has been reduced by efficient instruction and by enforcing the habitual use of the tooth-brush.

Not only has this movement for better dental conditions spread throughout Europe, but to the antipodes. In 1904 the Dental Association of New South Wales applied for and obtained permission from the educational authorities to examine the teeth of a number of public school children in that state. The investigations extended to school children of the poorer as well as of the more well-to-do classes. Of all the permanent teeth examined (both sexes) 17 per cent. were found to be defective; the average number of defective teeth was 4.4 per boy and 5.2 per girl. Among the boys 30 per cent. were recorded as having clean mouths, while among the girls 32 per cent. of clean mouths was noted, the others in each case being recorded as "fairly clean" or "dirty."

The figures given are based upon the examination of a total number of individual teeth, and do not take into account the percentage of individuals who were found to be free from caries of the teeth. Such individuals are, however, a minor quantity. Reliable English statistics show from various examinations that

the percentage of school children in England having decayed teeth varies from 75 to 97 per cent. In Germany, out of twenty thousand children examined, 95 per cent. had dental caries. In Russia the figures are the same, and in Italy between 90 and 100 per cent. of school children examined at various times were found to be suffering from dental caries.

Similar data have been collected in a number of countries, whereas the statistics for the United States are meager, and in some cases unreliable. It is regrettable that we have remained so long indifferent to the importance of this subject; we should have led in its investigation. The movement has started in New England, thanks to the remarkable work of the Dental Hygiene Council of Massachusetts, but this initial impulse should not be permitted to exhaust itself in a single effort. At the beginning of the season's work of society organization and in the preparation of meeting programs the question of dental service for public school children should receive its due share of consideration in the deliberations of all of the dental societies of this country. Every dental practitioner knows full well the extent of physical disability that can arise from lesions within the oral cavity, especially when acute in character, but by far the most important menace to health which occurs from disordered mouth conditions is that which arises from septic infection and consequent nutritional disturbances due primarily to an unhygienic condition of the mouth. Unsanitary oral conditions due to ignorance or carelessness, or both, can be corrected only by a campaign of education in which the dental profession and the educational authorities must co-operate if satisfactory results are to be achieved. It is easy for the most ignorant to understand that an acute attack of toothache will act as a source of disability to a school child; it requires much painstaking instruction to convince a fair proportion of people of even average intelligence that oral uncleanness, the destructive action of caries, and irregularities of the dentures, in so far as these interfere with proper mastication, are insidious factors which each in its way undermines the health and contributes toward the production of a degree of physical inefficiency which directly interferes with the progress of a child's education just as it does with the proper performance of any other department of life-work.

Defective vision among school children is generally receiving its share of attention by educational authorities, and naturally so, because defective vision constitutes a disability which obviously interferes with study. The disabilities arising from oral and dental lesions or a filthy mouth are doubtless as great in number and operate as potently as visual defects in interfering with effective school work, but because of their relative obscurity and insidious character, and because of the less obvious relation which the cause bears to the effect, they are overlooked or ignored in the general scheme of pediatric hygiene now arousing so much attention and interest.

We commend the study of this question to the organized professional bodies of this country as one which if wrought out into a practical plan of action will be fruitful of good to a most important element of the community, and one which if faithfully pursued will redound to the credit of the dental profession.

REVIEW OF CURRENT DENTAL LITERATURE.

[*Journal of the American Medical Association*, Chicago, March 20, 1909.]

THE INFLUENCE ON THE NOSE OF WIDENING THE PALATAL ARCH. BY DR. L. W. DEAN.

In co-operation with Dr. G. V. I. Brown, the author has made the following intranasal measurements before and after widening the palatal arch of a green skull:

(1) Distance across the posterior nares just posterior to the inferior turbinates—before, 32 mm.; after, 34 mm.

(2) Distance across the posterior nares just above the posterior ends of the middle turbinates—before, 23 mm.; after, 24.5 mm.

(3) Distance from the vomer to the outer wall of the nose in the posterior nares halfway from the posterior end of the inferior turbinate to the floor of the nose on the left side—before, 17 mm.; after, 18.5 mm.

(4) Same measurement on the right side—before, 24 mm.; after, 24 mm.

(5) Distance between the anterior attachment of the inferior turbinate in the inferior

portion of the middle meatus of the same point on the opposite side—before, 23 mm.; after, 25 mm.

(6) Distance between the vomer and inferior turbinate at the narrowest part of the inferior meatus, left—before, 23 mm.; after, 25 mm.

(7) Same measurement on the right side—before, 8 mm.; after, 9 mm.

These measurements speak for themselves.

[*Journal of the American Medical Association*, Chicago, March 20, 1909.]

RELATION BETWEEN DEVIATION OF THE NASAL SEPTUM AND IRREGULARITIES OF THE TEETH AND JAW FROM A RHINOLOGIST'S STANDPOINT. BY DR. N. M. BLACK.

The author's attention was first directed to the relationship between deflected nasal septa and jaw irregularities by the remarkable effect produced in a patient of thirty-three years of age who presented a very badly deflected septum with a high vault and laterally

contracted V-shaped maxilla. The application of a regulating apparatus to bring about proper occlusion of the teeth and to secure better mastication of food resulted in marked relief of the nasal stenosis. This led to an investigation as to the etiological factors in the production of deformed nasal septa, convincing the investigator that dental and maxillary irregularities are decided factors in

the production of deflected septa, but that complete relief without possibility of return of this distressing condition, when found in conjunction with dental deformities, can be brought about only by first correcting the deformity existing in the maxilla. The etiology factors producing septal deflection and dental and jaw irregularities are compared in the following tables:

SEPTAL DEFLECTIONS.

Predisposing factors.

Heredity.
 Racial characteristics.
 Admixture of racial types.
 Some defects in primary laws of organization.
 Diathetic or constitutional disorders:
 Rhachitic.
 Syphilitic.
 Tuberculous.
 Traumatism:
 In utero.
 During delivery.
 During early childhood.
 Inflammatory processes in nose, weakening structure.
 Local and general malnutrition.
 Infectious diseases.
 Diseases of the teeth.
 Degeneracy.

Actual factors.

Malocclusion.
 Traumatism:
 In utero.
 During delivery.
 During early childhood.
 At any period of life.
 Local and general malnutrition.
 Mouth-breathing.

Developmental factors.

Unequal development of the vomer.
 Under-development of the maxilla.
 Over-development of the maxilla.
 Non-development of the septum from disuse.

Force directly applied.

Foreign bodies.
 Nasal growths.
 Hypertrophic rhinitis.

Force indirectly applied.

Perverted muscular action.
 Mastication.
 Cheek and lip pressure.
 Atmospheric pressure.

DENTAL AND JAW IRREGULARITIES.

Predisposing factors.

Heredity.
 Racial characteristics.
 Admixture of racial types.
 Some defects in primary laws of organization.
 Diathetic or constitutional disorders:
 Rhachitic.
 Syphilitic.
 Tuberculous.
 Eruptive or infectious diseases.
 Local and general malnutrition.
 Mouth-breathing.
 Disuse.
 Habits:
 Thumb-sucking.
 Biting lower lip.
 Resting tongue between upper and lower lips.
 Degeneracy.
 Perverted cell action.

Actual factors.

Malocclusion.
 Premature loss of deciduous teeth.
 Prolonged retention of deciduous teeth.
 Loss of permanent teeth.
 Tardy eruption of permanent teeth.
 Supernumerary teeth.
 Abnormal frenum labii.
 Mouth-breathing.

Developmental factors.

Over-development of maxillæ.
 Arrest of development of maxillæ.
 Neurosis of development of maxillæ.

Force directly applied.

Perverted muscular action.
 Mastication.
 Cheek and lip pressure.
 Atmospheric pressure.

Rhinologists as a body do not as yet appreciate the benefits that may be obtained from widening the maxilla in nasal obstruction of any nature—even in pharyngeal adenoids—except obstructions due to malignant growths.

The objects to be obtained in treatment of septal deflections are: First, to establish free nasal breathing; second, to restore the septum to the median line with as smooth and even surfaces as possible; third, to equalize the space on either side of the septum, and fourth, to leave the septum with mucous covering as little injured as possible so that its function may not be impaired.

The age at which deflection of the nasal septum begins to make itself felt is somewhat disputed. Most operators prefer to operate early in life, before the fifth and sixth year or not later than the seventh, but as, according to Gray, the "superior maxilla commences to ossify at a very early period, but the sutures between the palate processes persist until middle life," the jaw may be widened at any time before this. The necessary nasal space should be obtained first, and then, if necessary, superfluous nasal tissues should be removed after the effect of partially restored nasal breathing has been observed for a time.

The chief reason why septal deformities tend to return is, in the first place, the difficulty in the removal of sufficient tissue to prevent backward pressure on the septum, and a consequent return of deflection. If too little tissue is removed, the result is unsatisfactory. In the second place, the main etiologic factor—that is, some dental or jaw irregularity—is overlooked and goes uncorrected. The main factor in the production of the deformity remains the lessened resistance in the deformed part, with a consequent tendency to return. This was much more frequently the case in the days before submucous resection, but to a certain extent still holds good.

The author in closing concludes that each of the specialties must recognize its relations to the other, and co-operate for the good of the patient.

[*Les Annales Dentaires*, Paris, May 1909.]

CONSIDERATIONS IN THE MAKING OF RUBBER PLATES. BY DR. M. IGEL.

While dentistry in all its other branches has been making rapid progress, it has been

revolving on one spot in regard to rubber prosthesis. In fact, the esthetic touch of the individual artist of high standing is sadly lacking. Above all it is imperative that rubber plates be of the same uniform thickness, and that the rugæ be faithfully reproduced. Generally the rubber is too thick at the dental arch, impeding the movements of the tongue in speech and mastication. Rubber plates as advocated by Dr. U. Müller of Zurich should be made of different kinds of rubber. The palatal side is constructed of black rubber, the lingual side and the gingivæ of pink rubber, and the teeth may be mounted with white rubber. The base-plate is preferably made of black rubber, because this is more solid and lighter; it should have a thickness of 0.5 mm. The lingual side of pink rubber should have the same thickness. The base-plate may also have a thickness of 0.7 mm. and the lingual layer one of 0.3 mm. as a total thickness of 1 mm. should not be exceeded. The pink layer will hide the black rubber, which in some persons is necessary in speaking or singing. Tin foil of a thickness of 0.5 mm. or 0.7 mm., representing the black rubber portion of the plate, is swaged on the swaging model. On this a second layer of tin foil is swaged of a thickness of 0.5 or 0.3 mm., representing the lingual portion. These two layers are then transferred to the plaster model, in place of the missing teeth wax is built up, and the bite is taken. The models are then placed on the articulator, and the teeth are adjusted, the wax being built up from the lingual side. The case is flaked as usual, and after all wax has been removed with hot water, the back of the incisors and the body of the bicuspid and molars is packed with white rubber. The flask is then boiled and pressed, after a piece of cloth has been laid between the flask and the cover. The white rubber that flows over the first tin layer is carefully cut away, and the gingivæ are packed with pink rubber. A layer of pink rubber is also packed on the lingual side, after the top layer of tin foil has been removed. Again a piece of cloth is inserted, and the flask is closed. If there is any excess of pink rubber, it is removed, the second layer of tin foil is taken away, the black rubber packed, pressed, and the flask closed. The different layers of rubber can be packed without running together in vulcanizing. Any excess is prevented by cutting the usual vents.

It is recommended to coat both halves of the invested flask with liquid silix, which produces absolutely smooth surfaces on the plate. If the hard portions of the palate and the rugæ are scraped before the flowing of the plaster, the plate will not press too hard on the hard portions of the palate.

[*Deutsche Zahnärztliche Wochenschrift*, Berlin, April 24, 1909.]

NON-TOXIC ANESTHESIA. BY DR. E. ECKSTEIN.

Under the above heading we reviewed on page 1123 of our September issue an article the contents of which have created considerable interest. Local anesthesia induced by the injection of spiritus ætheris compositus—Hoffman's anodyne—as suggested by Dr. Eckstein, has been tried by such an authority on anesthetics as Dr. Guido Fischer of Greifswald, whose experiments showed that it is sometimes possible with the aid of this anesthetic to obtain painless conditions. In most cases, however, the injection was only accomplished under great pain, and in several cases the anesthetic results were unsatisfactory.

In addition to this, the scientific justification of introducing a non-isotonic solution into the tissues is very doubtful from our modern conception of the processes of resorption, for a substance which in the living tissue acts as a foreign body must involve cellular damage. The consequences to be expected were really verified in one case: Six days after the injection of one-half cubic centimeter of spiritus ætheris compositus into the palatal mucosa of the maxilla, the patient returned complaining of continuous pain in the wound, that had been felt since the day of the operation. The originally hardly noticeable wound had enlarged continually, and the patient noted a disagreeable taste in the mouth. Upon examination it was found that the periosteum at the anterior palatal portion of the maxilla had been completely destroyed in the proximity of the central incisor extracted. The edges of the wound were far apart, and the mucosa, owing to the destruction of the periosteal basis, could easily be lifted from the bone. The mucous pockets thus produced were full of food remnants, and the bony floor appeared to be without any ves-

sels and colored gray. The whole presented the picture of a typical necrosis of the spongiöse and mucous cover within the area of injection. While these experiments are not claimed to be conclusive, they surely constitute a warning against the incautious adoption of Dr. Eckstein's non-toxic anesthesia, luring though this term may sound, before final experimental results have been obtained.

[*Oesterreichische Zeitschrift für Stomatologie*, Vienna, March 1909.]

PARTIAL RESTORATION OF FRONT TEETH BY CAST GOLD INLAYS COMBINED WITH PORCELAIN FACINGS OR SILICATE CEMENT FILLINGS. BY DR. H. ALTER.

For the partial restoration of front teeth injured by trauma or by caries, the author recommends the following method: Take for example a central incisor the crown of which has been broken by trauma and the vitality of whose pulp has suffered. The root-canal is treated and the tooth is ground off flat at the line of fracture, if possible in such a way that the ground surface is inclined palatally, as in the root-preparation for Richmond crowns. The canal is then prepared to receive a pin. Then a groove straight across the ground surface, or, in order to secure the smallest possible cement line, a cube-shaped box is cut. The platinum pin is fitted so as to protrude slightly above the ground surface, and the protruding part is roughened. Then the missing part of the tooth is modeled in blue wax, which is harder than rose wax and enables one to cut into it outside of the mouth the cavity intended for the reception of the porcelain facing. The wax is removed from the mouth together with the pin, and with a sharp instrument a cavity is cut in the wax with slightly undercut edges. The wax model is once more tried in the mouth, the sprue wire is fastened to the wax, and the inlay is cast with gold of a high karat. Into the front cavity a porcelain mass of the correct shade is fused, with a slight excess at the edge to be fitted to the natural tooth. The inlay is tried in the mouth after the exaggerated porcelain edge has been ground similarly to a Logan crown, and cemented to place. To simplify this operation, instead of the porcelain Ascher's cement may be used, which can easily be replaced.

[*Giornale di Corrispondenza pei Dentisti*,
Milan, January 1909.]

REIMPLANTATION OF TEETH. BY DR.
A. CHIAVARO.

Reimplantation of teeth consists in placing a tooth that has been removed experimentally or accidentally back into its proper socket. Transplantation, the transferring of another tooth of the same subject into a socket, and implantation, the introducing of a natural or artificial tooth into an artificially enlarged socket, are not durable operations. Reimplantation, on the other hand, has been practiced from time immemorial. Hippocrates and other ancient writers mention it, and since the end of the sixteenth century it has been practiced in cases of traumatism and disease of the root and the pericemental tissues, after all other curative means had failed.

Reimplantation is specially indicated in anterior teeth, but only after all other means have been exhausted and when the general health of the patient and the anatomical conditions of the tooth and the alveoli warrant success. If the tooth has not come out accidentally, it must be extracted with the utmost care, in order to avoid fracture during luxation and removal. The tooth is preserved in a non-acid antiseptic solution, preferably a twenty-five per cent. solution of phenol. The preparation of the tooth consists in completely emptying the pulp-chamber, disinfecting, desiccating, and filling it with gutta-percha. According to whether the tooth is sound or carious, the pulp is removed either through the apex or the cavity, most rigorous antiseptics being observed throughout. The tooth is carefully cleaned, restored to its oval shape if excrementosis or any other affection has disturbed it, and polished. The extreme end of the root is shortened by from one to two millimeters, rounded, and polished. If the crown needs filling or the root requires crowning, these operations are finished before reimplanting.

It is advisable to postpone the reimplantation a few days until the inflammation caused by the extraction of the tooth has subsided, and the injured tissues have started the process of repair. If a fistula is present in the alveolar wall, it must first be treated and cured. All the while the alveolar walls are

slightly painted with tincture of iodine, and they are allowed to bleed slightly in order to hasten granulation. If the alveolus shows a tendency to close too rapidly, it is restricted from doing so by aseptic tampons left in for twenty-four hours.

The reimplanted tooth must be held firmly during the period of consolidation. The means of retention vary according to the case. At times it suffices to ligate the tooth to the neighboring teeth, at others a more or less complicated retention apparatus is required. Contact with the antagonist must be avoided, and for that purpose one or more crowns are to be cemented on the posterior teeth. Immediately before the reimplantation the socket is prepared with Ottolengui's special bur, a tampon of cotton saturated with a five per cent. solution of cocaine having been applied. After the reimplantation the patient should be seen every day for some time. In young patients with well-preserved alveoli consolidation requires from fifteen to twenty days; in older patients from thirty to forty days.

Different theories as to the mode of fixation of reimplanted teeth have been advanced. Some believe in the regenerative power of the pericementum, others in incrustation of the roots in the socket, still others in a fusion between the roots and the alveolar partitions. Dr. Mendel Joseph, professor at the School of Dentistry of Paris, has recently published the results of his experiments on the teeth of dogs. He distinguishes between implantation of newly extracted teeth and teeth extracted for some time, and also makes a distinction between the mechanism of consolidation in these two cases. In the first case he attributes the process of repair chiefly to the alveolo-dental membrane, consolidation being due to a production of fibrous tissue; in the second case elements of the osseous environment intervene, consolidation taking place owing to the formation of a simple osseous body. He also seems to admit the regeneration of the alveolo-dental ligament in teeth reimplanted immediately after extraction and the intimate fusion of the tooth with the osseous alveolar tissue in the case of reimplantation of teeth extracted for some time. The author's own experiments on dogs, which were conducted at the School of Odontiatry, permit only of the deduction that the reimplanted teeth unite with the alveolar walls by way of

ankylosis. The remnants of alveolo-dental ligament which had been left attached to the pericementum of reimplanted teeth were noticed to have been entirely destroyed. Some lacunæ of Howship were observed, in which embryonal connective tissue was found, which subsequently became osseous. These osseous embryos, shooting forth from the alveolus, penetrate the lacunæ, and by a process of absorption implant themselves in the cementum of the root and hold the tooth in position.

In confirmation of the consolidation of reimplanted teeth by way of ankylosis, the following facts are cited:

(1) If a normal tooth is struck with a metallic body, a deep muffled sound is obtained, as in bodies surrounded by a soft membrane. If a reimplanted and consolidated tooth is struck with the same object, the sound characteristic of bodies surrounded by some investment is noted.

(2) Normal teeth, on account of their articulation in the alveolar socket, easily yield to a to-and-fro-movement in a linguo-buccal direction, while reimplanted teeth do not yield at all.

(3) If a reimplanted tooth is extracted on account of its having been fractured, one may notice that owing to the strong attachment of the root to the alveolus, a portion of the alveolus comes away with the root.

From his extensive experience the author arrives at the following conclusions: The success of reimplantation of teeth is assured—

(1) If the alveolus into which the tooth is to be reimplanted is not considerably destroyed.

(2) If the reimplantation is effected at the time when the tissues are on the way to regeneration, that is, from fifteen to twenty days after the extraction.

(3) If the surface of the reimplanted tooth fits exactly the inner surface of the alveolus.

(4) If the contact of reimplanted teeth with their antagonists is carefully avoided during the period of consolidation.

(5) If the means of fixation is such as to impede any movement whatever of the reimplanted tooth.

Necessarily all antiseptic precautions are to be carefully observed.

Dr. Chiavaro's article is accompanied by a number of beautiful and instructive illustrations

showing sections of normal and reimplanted teeth in dogs.

[*Deutsche Zahnärztliche Zeitung*, Berlin, May 30, 1909.]

RADICAL TREATMENT OF FISTULOUS FRONT TEETH AND CHRONIC OR ACUTE ROOT-ABSCESES. BY DR. J. HAAS.

To avoid a bloody operation in fistulous front teeth and chronic or acute abscesses of roots, the author, availing himself of the excellent properties of tricresol-formalin first suggested by Buckley, opens the apical foramen in front teeth by means of root-reamers, thus opening a reliable path for the infiltration of the abscessed area with tricresol-formalin. After disinfecting the root-canal with a tricresol-formalin dressing, which is allowed to remain for a day, the canal is cleaned and a reamer of very small size and great hardness, preferably Whites' or Rauhe's, is slowly introduced into the canal with little pressure, care being taken not to overheat the reamer. Then a drop of Buckley's solution, which is all that is necessary, is taken up in a Pravaz syringe, the needle being inserted as far up in the canal as possible. If sufficient pressure is applied, the liquid takes its way either through the fistulous tract or remains in the hollow space created by the blind abscess. The overflow is absorbed with cotton pellets. To avoid the excessively caustic effect of tricresol-formalin, the author uses a strong solution of bactoform, which is also a formalin preparation. Generally after one medication healing occurs. If not, the operation is repeated until the fistulous tract closes or no more pus is discharged from the blind abscess. Any objections that might be raised the author offsets with the following considerations: (1) No necrosis of any kind has ever been observed. (2) The antrum has never shown any untoward symptoms. (3) Even in cases of curved root the result was perfect. (4) Circumscribed periodontitis following the injection disappeared within one or two days without leaving a trace. (5) Only two failures have been observed. In the first case the fistula would not close up, presumably because an excessive quantity of tricresol-formalin had been injected. In the second case a parulis, which had been present before the treatment was

begun, persisted, and the rather frail root of about 6 mm. length had to be extracted. The patient, moreover, had come from a long distance, and the haste with which the operation had to be executed probably contributed to the failure. Dr. Haas goes on to cite in detail four typical cases in which the operation described yielded perfect results, justifying his belief that this harmless and easy procedure will, in a great many cases, do away with the much-dreaded maxillotomy, with all its disagreeable sequelæ.

[*Le Laboratoire et le Progrès Dentaire*, Paris, February 7, 1909.]

A CASE OF MERYCISM (RUMINATION).

By DR. PITTSCH.

Merycism (rumination) is a disease in which the swallowed food returns into the mouth and is masticated once more. The effect which this disease, which might also be called a filthy habit, has upon the teeth renders it interesting to the dental practitioner. The case cited by the author is that of a boy of fifteen and one-half years of age, of strong muscular constitution, whose father is in excellent health with fairly good teeth. The mother is a neurasthenic, with chronic paralysis of the lower extremities and poor teeth, which owing to good dental care are preserved with the exception of four. An inclination to rumination was also observed in another of the five children, but had been overcome. The patient, who as a baby had been fed with the bottle, had been in the

habit of drinking excessive quantities of milk, which he subsequently vomited, thus acquiring his habit. At first, rumination took place fifteen to thirty minutes after each meal, at the time of consultation about four hours afterward. The consequences of this habit are sadly manifested in the patient's mouth. The deciduous set and the first molars were attacked by caries immediately upon breaking through, the latter having been extracted when the patient was about seven years of age. At the time of consultation not one sound tooth was left. The crowns of all upper molars have disappeared, with the exception of those of the left canine and first bicuspid, which are, however, considerably carious. Since his twelfth year the patient has been wearing a bridge, which has become loose, consisting of the two upper centrals and the left lateral. The upper left canine, the right lateral, and the lower right lateral bear porcelain crowns. The other lower incisors are deeply carious and painful. In masticating the patient uses only the incisors and canines. As all roots and crowns had become useless and were beyond the possibility of preservation, they were extracted, and a full denture was made. This complete destruction of the teeth is no doubt to be attributed to the acids of the mouth. The disease disappeared after the denture had been put in the mouth, presumably owing to the improved means of mastication, and only now and then after eating his favorite dish the patient relapsed into his former habit, which he did not regard as disagreeable.

PERISCOPE.

Prevention of the Rusting of Instruments After Sterilization.—The rusting of delicate instruments may be avoided by boiling them in pure glycerin. The glycerin gives off strong vapors owing to the water which it contains. These vapors are harmless, and can be allowed to escape into the open. In order to prevent the rusting of larger instruments, such as forceps, they are boiled in water or in a soda solution, and while still hot they are thoroughly dried and placed in the in-

strument case, without having been dipped into any disinfecting solution. By drying the instruments in a still hot state, the water which cannot be reached by the cloth evaporates quickly, and the dry instrument rarely rusts. Smaller instruments, such as cannulas, hypodermic needles, surgical needles, burs, small files and stones, after boiling are kept ready for immediate use in a wide-necked and tightly-stoppered bottle half filled with tricresol-formalin-glycerin—in the proportion

of glycerin about 100 grams, tricrosol-formalin from 5 to 8 drops.—A. NEUMANN-KNEUCKER, *Oesterreichisch-ungarische Vierteljahrsschrift für Zahnheilkunde*.

Mixing Silicious Cements.—Some of the silicious cements are so susceptible to a hastening of setting from a rise of temperature that there is a decided advantage in working upon a chilled slab. A cement which would be objectionably quick-setting when mixed on a slab of room temperature, will admit of the incorporation of more powder and be rather slow of setting when mixed on a chilled slab.—W. V-B. AMES, *Dental Review*.

Underheating Molds in Casting.—Underheating a mold is at times the cause of a lost casting. The heat generated in melting the gold causes steam to form in the investment, which forcing its way out through the sprue hole, as we attempt to drive the molten metal in, nullifies the pressure. A cold or damp mold frequently causes the metal to recoil (or spit up), thus forming imperfect edges by its failure to lay up against the mold. A cold mold is denser than a heated one, and does not allow the dispersion of air through the investment material.—F. H. NIES, *Items of Interest*.

Tricrosol Formalin and Sore Fingers.—Every practitioner after handling the cork or glass stopper of a tricrosol bottle has observed very troublesome and painful crevices in the epidermis of his fingers, which will heal only after several months' treatment. This should be avoided by always removing and replacing the stopper with a pair of pincers. If, nevertheless, some tricrosol has come into contact with the fingers, they should be dressed before retiring with lanolin cream or perhydrol 50 parts and glycerin 100 parts. Dermatol salve also renders good service.—C. FAHSEL, *Archiv für Zahnheilkunde*.

Repairing a Broken Incisor Crown.—If in a broken incisor crown the unbroken pin remains standing above the level of the root, a gold tube is fitted to the standing portion and allowed to project above it, if necessary, and a model is taken of the space with the tube in position. A flat tooth is fitted in the ordinary way, preferably in the mouth, and is then waxed in position with the tube and carved to the requisite size on the model, invested, and cast in the ordinary way. As a precaution against the tube shifting in the investment, a short wire is passed through it after carefully filling it with the investment.—A. L. BOSTOCK, *British Dental Journal*.

Examination for Adenoids in Children.—As it is difficult to make an examination of the naso-pharynx with a mirror in a child under six years of age, the diagnosis is made by feeling with the finger. The forefinger introduced gently through the mouth recognizes by the sense of touch the worm-like masses of mushy material partially filling the vault. The examination with the finger need occupy but a second. The finger when withdrawn will often be coated with thick white-egg-like mucus and streaked with blood. Adenoid vegetations occurring in infancy and in children from three to twelve years of age are rarely mistaken for anything else.—H. G. LANGWORTHY, *Dental Review*.

Color of Gold Inlays.—The esthetic effect of an inlay can be increased materially by the addition of platinum and silver to the gold. It will produce a gold very much lighter in color than pure gold, and the surface is much harder. This light-colored gold can be used in cavities which show the filling plainly. It will give the same effect that the old platinum fillings gave, which in most lights are practically invisible. In an approximal cavity of the front tooth, where only a small portion of the gold is visible, it is better to use a darker gold; but if the cavity necessitates a large exposure of gold, as in the building of a point on a tooth, then the light gold is preferable. A little experience with the different colors will demonstrate their correct application.—A. E. PECK, *Dental Digest*.

Accurate Adaptation to Badly Decayed Roots in Crowning.—A simple and most efficient method of securing an accurately fitting base and pin for crowns is the following: Have always ready several platinum posts of small and medium sizes with disks of gold 32-gage, 22-karat, soldered at about the point to which you might expect the pin to enter the root-canal. Remove all decay and prepare the root in a manner that will impart to it greatest resisting strength. Shape the pin so that it enters the root until the disk just rests on the most prominent part. Trim the disk and bend it until it approximates the shape of the root. Flow wax on the under surface of the disk, and if the root is unduly enlarged by decay, let the wax extend down the pin. Press the wax to place, chill, and remove it, and trim away any excess. Add more wax if necessary and press it to place again. Remove the wax and insert the sprue in it, and cast with 20 or 22-karat gold. You can then depend on obtaining a perfectly fitting base for the crown, the speed and ac-

curacy in obtaining the impression being chiefly due to the disk of gold fixed on the pin.—J. STEELE, *Items of Interest*.

Artificial Teeth Generate Electricity.—

A curious case has just been recorded in which an electric current was found to be generated by a plate of artificial teeth. Doctor and dentist were baffled when the patient complained of a pain in his tongue, and the sufferer mentioned the fact to an electrician whom he knew. On examining the teeth, his friend found that two metals were used to fix them to a composition plate. To these metals wires were then attached and connected to a galvanometer. Then the teeth were replaced in the patient's mouth, and the metals moistened with saliva. No sooner was this done than the galvanometer showed quite a strong current from so small a source—enough, it is stated, to cause ulceration and severe pain. The plate was covered with an insulating varnish, and thenceforward all the trouble ceased.—*British Journal of Dental Science*.

Removal of Small Gingival Tumors or Ingrown Gingival Tissues.—

To remove small tumors due to cellular proliferation from irritation and gingival tissue grown into a cavity, which bleed at the slightest touch and seriously impede the operator's progress, a pellet of cotton saturated with castor oil in collodion is inserted into the cavity after having been dipped into tannic acid. If this dressing is renewed for two or three days, the tumor will disappear, and the ingrown gingival tissue be forced back by way of compression. The mucosa hardens and can be touched without subsequent hemorrhage. The same principle may be applied in order to lay open the roots of teeth to be crowned. The collodion can easily be removed from the fingers and the instruments. Some antiseptic, carbolic acid, menthol, or the like, may be added to the collodion.—A. SIFFRE, *Annales Dentaires*.

Copper Amalgam as a Basis for Cement Fillings.—

Copper amalgam in central cavities is packed like a cement base for amalgam fillings, so that the cavity edges remain free and no discoloration from the fluids of the mouth can take place. If the cavity reaches under the gingiva, its cervical edge may be built up with copper amalgam to the gingival line, in that way preventing recurrence of caries at the cervical edge. This base of copper amalgam is absolutely impermeable to the secretions of the mouth, and prevents any irritation and subsequent necrosis of the pulp as occur under cement fillings. The copper amalgam layer also acts as a

preservative, if the patient does not present in time for the renewal of a temporary cement filling. This copper amalgam base is specially used in first molars with a temporary cement filling, which may be later on replaced by an inlay. For twenty years no untoward effects from thermal shock have been noted, although copper amalgam is not a poor conductor like gutta-percha. A base of copper amalgam under other amalgams does not seem to possess the same conservative qualities, as it partakes of the contraction of the other amalgam, thus producing imperfect marginal adaptation.—DR. JUNG, *Deutsche Zahnärztliche Zeitung*.

Making the Rugæ on Vulcanite Plates.

—Take a piece of Ash's No. 3 soft metal, cut it to the required size to cover the palate of the plaster model, then burnish the soft metal into the rugæ with a dragon cane or any piece of soft wood. This will be found to produce the same result as a swaged or struck-up plate.

When the burnishing has been completed, remove the soft metal plate from the model. Then warm a piece of sheet wax of the required size of the plate, gently press it on the model, and take care not to stretch it, so as to avoid the possibility of unevenness in the thickness of the plate.

Slightly warm the soft metal plate, also the wax base-plate, and place the soft metal plate on the wax base-plate.

A true reproduction of the rugæ will be imparted to the vulcanite if this simple method is faithfully carried out.—THEODORE PHILLIPS, *Ash's Quarterly Review*.

Oral Antisepsis.—Oral antisepsis is specially important before and after operations, and in cases of stomatitis, gingivitis, infectious diseases, etc. Cleaning the teeth with a brush charged with a small quantity of perborate of soda and subsequent rinsing with water in which a pinch of perborate of soda has been dissolved is recommended. To complete disinfection and to remove the disagreeable taste of the perborate of soda, the patient is requested to rinse his mouth with boiled water with which the following solution has been mixed: Essence of mint, essence of aniseed, essence of eucalyptus, 2 grams each; carbolic acid, 4 grams; 90 per cent. alcohol, 60 grams. Half a teaspoonful of this solution is added to half a glassful of water. The perborate of soda produces oxygenated water free from any acid, thus avoiding any irritation to the mucous membrane.—H. BOURGEOIS, *Le Laboratoire et le Progrès Dentaire*.

Casting Against Porcelain.—While the removal of the porcelain crown or facing from the wax prior to investing and casting, and its subsequent attachment to the metal by means of cementation, offers indisputable advantages, some prefer to include the porcelain in the investment and cast directly to it. This may be done easily, since such a procedure involves only a question of heat, and this demands that the investment and porcelain be heated to a very red heat before, and remain at this temperature at the time of casting. If this is carefully done, any of the metals or alloys used in casting and fulfilling the requirements may be cast directly to the porcelain, which will thus become an integral part of the piece, and two or even more facings or crowns may be included in the same casting, provided that sufficient space exists between them to allow for a probable shrinkage of the metal in cooling.—H. J. GOSLEE, *Items of Interest*.

Two-Part Banded Crown Made with an Ordinary Diatoric Tooth.—The root is prepared, measured, and the band fitted in the ordinary way. It should only be about one-eighth of an inch or so above the gum level. A model is taken, Spence metal cast into the band, and the model completed with plaster. A diatoric tooth is ground so as to fit inside the band, slightly grooved upon the portion which fits inside, and is then pressed into wax placed inside the band, removed and trimmed, and the gold is cast as usual. When completed it will be found to fit exactly into the band, which is first cemented upon the root, the tooth being fixed by a second cementation. The advantages claimed for this method are: Improved appearance; the band being separate, a better fit is secured; a minimum of cement can be used for setting, and the rubber dam can be adapted to the band when fixed, so as to facilitate subsequent setting of the crown.—A. L. BOSTOCK, *British Dental Journal*.

Dental Inspection in Schools.—Wherever the question of dental inspection in schools is raised, the name of Prof. Dr. Jessen of Strassburg comes with it. He is the great originator of the work, and Strassburg is today the center of the movement for Europe. It is the center of an important work, for no less than thirty cities of the Fatherland support free dental clinics where work is done on the teeth of school children. Dr. Jessen became years ago impressed with the general diffidence prevalent among the people in the matter of dental hygiene, and came to the

conclusion that a large percentage of illness and disease is due to defective teeth. He labored long and ardently in behalf of a better understanding on the part of the people. He has lived to see his views accepted by one continent, with another just ready to fall in line; he has been able to found on them great gatherings of interested medical men. At the congress in London, two years ago, devoted to school hygiene, he met two thousand delegates from every part of the world who had an opportunity to make themselves interested in his subject—the teeth of school children. In his own land he has seen a rare stirring on every hand. One result has been a close investigation by a state commission, which has reported on the condition of teeth in the schools and in the army. In brief, the conclusions of this body may thus be stated: That diseased teeth are the most common of all diseases; that the physical and mental development of children is injured by such teeth, the health suffering accordingly; that the improvement and eventual overcoming of these conditions is possible only by the introduction of dentists into the school and the army, and that it will be necessary to establish state dental hospitals, the cost of which will be small in comparison with the benefits received. For seven or eight years the work in Strassburg has been in progress under the eye of Dr. Jessen, so that what he has to say in the matter is born of actual experience. He himself conducted the smaller of the figurings with school children, those of the 20,000 scholars, and one may readily see that he has done this work upon a truly practical scale. His estimates for Strassburg have been that the cost is about twenty-five cents per pupil. The item of the health of the pupils has been very carefully looked into, and he asserts that there is evident improvement. The scholars show not only a benefit in health, but increased efficiency in their studies, and in addition save the time that was previously lost by them on account of ill health. So impressed is the municipality of Strassburg with the value of Jessen's work that it has erected, at a cost of \$60,000, a building to be devoted to the service of the dental inspection of the children in the public schools. When one remembers the economy that Europeans have instilled into them from their earliest childhood, the expenditure of so considerable a sum is the best kind of proof of the high esteem in which the matter of dental hygiene in the schools is held.

Another outcome of the work of Professor Jessen is that in Germany on the first day of February last, there was established a German Central Committee for the Care of

Teeth in Schools. The purpose of this association is to interest the people in the matter of the care of the teeth, to secure the publication and distribution of articles on the subject, to disseminate information among school associations, to have dental hygiene taught in the schools, and to enlist state and communal co-operation in forwarding the important

work. This organization has already been the means of bringing into close touch for effective work on the same general plan the health officials and dentists in such cities as Berlin, Ulm, Brandenburg, Breslau, Cologne, Heidelberg, and Strassburg, together with prominent medical officers in the German army.—*Boston Transcript*, per *Dental Brief*.

HINTS, QUERIES, AND COMMENTS.

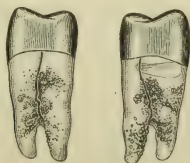
CAST GOLD INLAYS.

In using occlusal gold inlays, the operator will find that a piece of rubber dam just large enough to cover the wax model, placed between the occluding teeth while the wax is soft, will make the articulating surface of the inlay occlude exactly, and there will be no grinding to do when the inlay is finished and polished.

CALVIN W. KNOWLES, M.D., D.D.S.
San Francisco, Cal.

SERUMAL CALCULUS IN A FRACTURED TOOTH.

The following case is of some scientific interest: The bicuspid illustrated had sustained a longitudinal fracture thirteen years



ago, and had been crowned immediately. Two years ago a decided loosening was noticeable, which gradually increased. The tooth was then extracted. Serumal calculus has succeeded in forcing its way to the apex, producing a pyorrheal condition, yet there is no indication of this disease in any other part of the mouth, even the approximating teeth being free from any trace of this affection. The fracture evidently produced irritation

enough to induce a beginning of serumal calculus, which kept up the irritation until the tooth was finally lost.

H. H. JOHNSON, D.D.S.

Macon, Ga.

LACK OF COHESIVENESS OF GOLD FOIL.

HAS anyone ever had this experience? The odor of fresh paint containing plenty of creasote was abundant in the air. The wind was blowing from the direction of a building, about 125 yards distant, on which the painting was being done. I attempted to fill a cavity with gold, and succeeded in inserting half the filling, when it was impossible to make another piece of foil cohere. Several new starts were made, all to no avail. It was noticed that the gold was very cohesive on the annealing tray over the flame, and that the lack of cohesiveness was not due to any leak in the rubber dam. Suspecting that the odor of the paint caused the trouble, the room was entirely closed with the exception of a door on the side opposite to that which faced the building on which the painting was being done. After waiting for some time in order to allow the air in the room to diffuse, an entirely new start was made, yet without success. There was, however, still an odor of creasote present. After two and one-half hours had been spent in vain trials, the patient was dismissed no further advanced than when he had arrived.

Are the gases from the paint responsible?

CHAS. J. ALLEMAN.

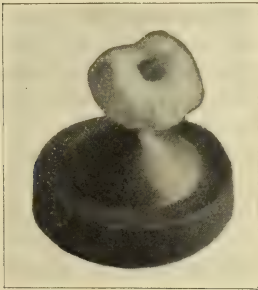
Church Point, La.

PROCEDURE FOR MAKING HOLLOW INLAYS.

As the technique of making gold inlays is very generally known, this procedure, which has been in daily application for over a year, need only be studied in regard to the investing of the model.

The model, after having been removed from the tooth on the sprue, is set on the cone, and all the surfaces, mesial, approximal, occlusal, and those in contact with the cavity walls, are invested, leaving free, however, the surface nearest to the floor of the cavity.

FIG. 1.



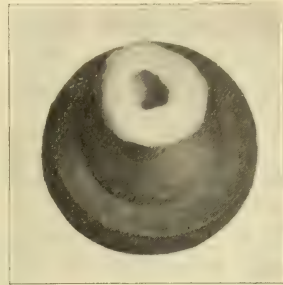
First phase of procedure, with mural, approximal, and occlusal surfaces inverted; floor entirely free.

(Fig. 1.) After the investment has hardened, all the wax is removed with boiling water, the delicate borders are smoothed and trimmed until they are uniformly and plainly defined. In the interior of this mold the end of the sprue will be seen, also the mesial, approximal, and occlusal surfaces ready for the lining of wax. This wax lining is made by dropping a small quantity of the paraffined rose-colored wax of the inlay outfit from the pointed end of a hot spatula. This lining may be as thick or as thin as the operator may desire, producing a smaller or larger vacuity. (Fig. 2.)

The advantage of the hollow inlay lies not so much in the saving of gold as in obtain-

ing a hollow space, which is a very valuable aid in the mechanical retention of the inlay. (Fig. 3.)

FIG. 2.



Second phase, with border trimmed and wax in view before completing investment.

After some practice and with a clever twist of the hand, the wax will spread in the interior of the mold with great evenness, just like the plaster of Paris in the interior of

FIG. 3.



Final phase of inlay before being finished, showing vacuity.

the rubber or gelatin mold of the Italian statue-molder, who is capable of casting his statuettes with a minimum of plaster.

The rest of this procedure follows the general rules of inlay work, both the direct and the indirect systems being applicable.

J. CLYDE MACARTNEY.

Montevideo, Uruguay.

OBITUARY.

DR. ELKANAH B. HOSKINS.

DIED, at Whitefield, N. H., July 1, 1909, after a lingering illness from creeping paralysis, Dr. ELKANAH BARNEY HOSKINS of Lisbon, N. H., in his fifty-seventh year.

Death has claimed one of the leading dentists of New Hampshire, Dr. Elkanah B. Hoskins, who for many years occupied a most prominent place in his profession.

He was born in Lyman, N. H., in 1852, his ancestors having been the most prominent inhabitants of that town, both in political and social affairs. The decedent acquired his early education in the town schools, later on supplementing his training by attending McIndoes and Peacham, Vt., academies. His first association in dental learning was with Dr. Perkins of St. Johnsbury, Vt., which was continued with Dr. Webber of Boston and Dr. Bowles of Lisbon, N. H. In 1878 Dr. Hoskins received the degree of D.D.S. from the Pennsylvania College of Dental Surgery, after which he commenced practicing in Littleton, N. H. Soon afterward he removed to Manchester, *i.e.* in 1880, where his strong and engaging personality soon assured him widespread popularity and a large *clientèle* from the representative people of that section.

Owing to continued ill health, he was never able to fully comply with the extensive demands of his practice, and finally being unable to fulfil his duties for prolonged intervals, he was obliged to relinquish active practice, and in 1886 moved to Lisbon, where his parents also located soon after. Here he continued, however, to attend to some of his former patients until within the last three or four years, when his complete retirement from the practice of dentistry became necessary.

Dr. Hoskins had a wide circle of acquaintances among the dentists of New England, and those familiar with his abilities regarded him as one of the foremost operators in cohesive gold work.

He was a man of powerful intellect, pos-

sessing a vast fund of practical knowledge not only in regard to dentistry, but also to topics of the day, and those who were numbered among his friends are indeed richer for having associated with him. He was a man of retiring disposition, and never could be induced to engage in politics to any extent. He joined the Masons and the Odd Fellows many years ago. Religiously he was a broad, liberal thinker, with a leaning toward Unitarianism, although he was never directly affiliated with that denomination. He was never married, and is survived by an aged father and mother.

Interment was made at Lisbon, N. H.

DR. FREDERICK SHIVELY WHITSLAR.

DIED, at his home, 265 Boardman st., Youngstown, Ohio, of paralysis followed by emphysema of the lungs and heart complication, August 7, 1909, Dr. FREDERICK SHIVELY WHITSLAR, in his eighty-fifth year.

Death has concluded the remarkable career of a famous dentist and brave captain of the civil war, Dr. F. S. Whitslar. Probably no man was better or more favorably known in Ohio than Dr. Whitslar. He was regarded as an authority on matters pertaining to dentistry, and practiced that profession for more than fifty years. He was a self-made man of the best type, learning mostly from attending dental society meetings and carefully reading dental journals. He was one of the "old guard" together with Taft, Atkinson, Rehwinkel, Watt, and others in Ohio who were foremost in the development of the dental profession. He wrote many articles which appeared in dental magazines, and became widely known as a writer upon advanced methods in dentistry. Besides making a name for himself in the dental world, the deceased bore an honorable record as a captain in the civil war. He was also widely

interested in philanthropic, political, religious, and educational matters.

Dr. Whitslar was born in Austintown township, at that time in Trumbull county, Ohio, on September 7, 1824. Born in the pioneer days of Ohio, he was sent out as a lad to work on a farm. While a young man he taught school in the old log schoolhouses, and later took up the practice of dentistry. He was active in politics, especially at the time before the civil war, when he was an active anti-slavery advocate. He was also first president of the Youngstown city council. When the great conflict broke out, Dr. Whitslar enlisted, May 2, 1864, and was mustered into the United States service at Camp Dennison, Ohio, as captain of company D, 155th regiment Ohio Volunteer Infantry. Captain Whitslar at all times performed gallant and meritorious service, and was commended by his superior officers for his bravery and general conduct. He received an honorable discharge on August 27, 1864.

Dr. Whitslar was an elder of the Central Christian Church of Youngstown, and often substituted for ministers of all denominations, having an ability to speak on religious themes that was equally as remarkable as his eloquence on political subjects. He was always willing to help poor congregations, and gained a reputation as the "marrying parson," although the number of couples he married has been overestimated.

He was a member of Tod Post, No. 29, Department of Ohio, Grand Army of the Republic, in which he has filled the office of chaplain three times, and was senior vice-commander. He was also a member of the Delta Sigma Delta Fraternity, the American Dental Association, the Northern Ohio Dental Association, of which he was president, the Odontological Society of Western Pennsylvania, over which he also presided, the Mahoning County Dental Association, the State Dental Society of Ohio, the Twenty-second District Missionary Society, of which he was president, also charter member and organizer of the city library association of Youngstown.

Dr. Whitslar married Miss Matilda Fox, on March 4, 1849, at Canfield, Ohio. Mrs. Whitslar died October 28, 1898, but three children, Dr. W. H. Whitslar, a Cleveland dentist, Grant S. Whitslar of Youngstown,

and Mrs. Allie W. Carr of Youngstown, survive him.

The funeral was in charge of Tod Post; interment was made at Oak Hill cemetery.

DR. JOHN W. HAUGHAWOUT.

DIED, at his home, 520½ Central ave., Fort Dodge, Ia., of diabetes, July 18, 1909, Dr. JOHN W. HAUGHAWOUT, in his sixty-eighth year.

With the demise of Dr. John W. Haughawout a prominent dentist, ingenious inventor, and gallant sportsman has passed away.

The deceased was born in Brown county, Ohio, February 22, 1841, and grew to manhood in his native state, although he later removed to Wisconsin, where on August 15, 1862, he enlisted as a private in company B, 23d regiment, Wisconsin Volunteer Infantry. He was discharged May 26, 1863, for disability, but recovering his health he re-enlisted in company H, 44th regiment, Wisconsin Volunteer Infantry, on February 11, 1865. He was soon afterward promoted to sergeant, and was later placed on detached service as teacher of the freedmen. On August 28, 1865, he received an honorable discharge from the United States service.

About the time of the war he married Miss Louise Beebe of Wisconsin. Shortly after the close of the war he took up the practice of dentistry, which he followed continuously up to the time of his demise, at various times conducting offices at Atlantic, Ill., Omaha, Neb., and later at Fort Dodge, Ia., where he has practiced for the last sixteen years. While practicing at Omaha his health began to fail, and for a time he traveled, deriving great benefit therefrom. On April 6, 1889, at Logan, Ia., Dr. Haughawout married again, his second wife being Miss Etta Hines, who together with four children is left to mourn his loss.

Dr. Haughawout was a man of strong mind, analyzing whatever he came in contact with and accepting only that which he was able to prove. He was an inventor of many and most useful appliances, most of which were placed on the market as soon as completed and for that reason fail to bear his name. Chief of these inventions is the rotary snow plow which has saved the railroads of the West many millions of dollars, and but for

which the abandonment of many roads for long periods during the winter would be necessary. He also invented many medical and dental appliances for which he saw a need, as well as sporting apparatus for the trap-shooter. He was a lover of outdoor life and was deeply interested in trap-shooting, attending many of the tournaments held in various parts of the country. He was the real organizer of the A. H. Fox Gun Club of Fort Dodge. It was his wonderful vitality that enabled him to withstand so long and bravely the inroads of the disease which was sapping his strength.

The funeral was in charge of Fort Donelson Post, G. A. R.

DR. E. L. HUNTER.

DIED, at Fayetteville, N. C., of heart failure, August 10, 1909, Dr. E. L. HUNTER, in his seventy-second year.

Dr. E. L. Hunter, dean of the dental profession of Fayetteville and one of the foremost dentists in North Carolina, died of heart failure at the home of his daughter, Mrs. C. D. Sedberry, where he had lived for several years.

Dr. Hunter was born near Enfield, N. C., April 27, 1837. He was graduated from the Baltimore Dental College in 1871. He served with the Confederates during the civil war, and was taken prisoner with the fall of Fort Fisher. In 1892 he went to Fayetteville, where he practiced dentistry until his death. He was a member of St. John's Episcopal Church, and a faithful Mason.

He was twice married, his first wife being Miss Buster of Enfield, and the second Miss Powers of Fayetteville. He is survived by one daughter, three granddaughters, and two grandsons.

DR. ALBERT T. EMERY.

DIED, at his summer home, Crescent Beach, South Thomaston, Me., of paralysis, August 1, 1909, Dr. ALBERT T. EMERY, in his eightieth year.

With the demise of Dr. Albert T. Emery, one of Boston's old-time dentists who had for his *clientèle* the most prominent old Boston families has passed away. He had his professional offices for about thirty-five years at No. 1 Mount Vernon st., before the houses

there gave way, in the march of progress, to the present State-house park. Dr. Emery was a native of Rockland, Me.; his early life, however, was spent in South Thomaston, until his family removed to Boston. After several years of study and laboratory work under the guidance of Dr. N. C. Keep of Boston, deceased was graduated from the Philadelphia Dental College, and began practice in Boston in association with Dr. J. L. Williams. He was at that time an ardent supporter of the ministrations of Theodore Parker, and was active in the affairs of the Parker Fraternity. Having accumulated a considerable fortune in his practice, he retired about ten years ago. He had since spent most of his time in Los Angeles, Cal., where five years ago he became the owner of one of the finest residences. Although Dr. Emery was one of the pioneer cottagers in the Crescent Beach colony, this was the first summer in five years that he had spent in Maine to occupy his cottage. He was deeply interested in floriculture, and his gardens were notably fine and attractive.

Dr. Emery is survived by his wife, who was formerly Miss Mary E. Andrew of Massachusetts. Following funeral services at Crescent Beach, the body was conveyed to the Boston Crematorium.

DR. EDWARD A. KENT.

DIED, at his home in Atlanta, Ga., from inflammatory rheumatism, September 11, 1909, Dr. EDWARD A. KENT.

Dr. Kent was born at Hamilton, Ont., Canada, April 11, 1866. After being graduated at the Philadelphia Dental College in 1895, he practiced in Hartford, Mich., and Pittsburg, Pa., for four years, then removed to Atlanta about eleven years ago, where he remained in practice up to the time of his death. He ultimately became a specialist in oral surgery, and was rapidly building up a practice in this particular line. He was always a successful man in his profession, and enjoyed the patronage of a large *clientèle*. Of a quiet and retiring nature, he was at the same time very genial, and during his stay in Atlanta had established many warm friendships. Always a hard worker, he accomplished a great deal in his profession, while

at the same time he never lost an opportunity of doing some good service or extending a helping hand to those in need of it. His word was always as good as his bond, and his close associates regarded him with affection and esteem.

He is survived by his wife, who was Miss Lena A. Lyle of Decatur, Mich., and two children, a son and daughter.

The funeral took place from his late residence, on Sunday, September 12th, and was largely attended by his friends and by members of his profession.

DR. CHALKLEY THOMAS.

DIED, at his residence, 1230 West Tenth st., Des Moines, Ia., June 15, 1909, in his seventy-second year, Dr. CHALKLEY THOMAS.

Esteemed as a man, honored as a citizen, and beloved as a veteran of the civil war, Dr. Thomas by his demise aroused deep regret and profound sorrow among the large number of citizens who were favored to know him. Dr. Thomas was born in Harrison county, Ohio, October 3, 1837. He entered the military service as a private in company

K, 17th Ohio Volunteer Infantry, on April 20, 1861. This regiment was attached to Rosecrans' brigade at first, went into the West Virginia campaign, and was discharged in August 1861. Dr. Thomas re-entered the service as first sergeant of company G, 98th Ohio Volunteers, in August 1862, was commissioned lieutenant in May 1864, and captain in September of the same year. He remained in the service till June 1865.

About twenty-five years ago he went to Des Moines, Ia., and engaged in the practice of dentistry, in which profession he continued with great success and remarkable skill until his demise.

Dr. Thomas was for years the treasurer of the Loyal Legion of Iowa, of which he was an honored member. He was also identified with Crocker Post, G. A. R., and was a member of U. S. Grant camp of Modern Woodmen.

He is survived by his wife, Mrs. C. Thomas, and a daughter, Mrs. Fred H. Sales of Des Moines, Ia.

The funeral was in charge of Crocker Post, the Woodmen and the Loyal Legion attending in a body.

SOCIETY NOTES AND ANNOUNCEMENTS.

IOWA STATE DENTAL SOCIETY Pathological Study Club.

THE next meeting of the Pathological Study Club of the Iowa State Dental Society is to be held at Des Moines, Ia., November 1 and 2, 1909, in the Dental Department of Drake University. First lecture at 10.30 A.M., November 1st, by Dr. Logan, who will at that time complete his series of Dental Pathology.

The subjects to be discussed at this meeting will be: "Caries—Enamel and Dentin"; "Caries and Necrosis of the Alveolar Process and of Bone"; complete the subject of "Pericementitis and Alveolar Abscess."

The members of the Study Club are requested to read the following articles: "Burchard's Dental Pathology," 3d edition. "Dental caries," pp. 304-374; "Pericemental dis-

ease beginning at the gum margin," pp. 591-666. DENTAL COSMOS: "Post-Extraction Sequelæ," by Otto E. Inglis, June 1909, p. 693. Dental Review: "Oral Prophylaxis," by J. V. Conzett, February 1909, p. 127; "Conditions of Saliva in Relation to Dental Caries," by G. V. Black, April 1909, p. 301; "Synopsis of the Discussion between Kenneth Goadby and W. D. Miller on 'Micro-organisms in Dental Caries,'" by J. E. Hinkins, June 1909, p. 522.

There are still a few vacancies in the membership of the club. Any practitioner who is a member of the State Dental Society is eligible. Application should be made at once to the secretary, as the membership is limited to fifty.

W. C. BOONE, Sec'y.

DENTAL INDEX BUREAU

UNDER THE AUSPICES OF THE

NATIONAL ASSOCIATION OF DENTAL PEDAGOGICS.

THE following matter has been issued in the form of a circular justly purporting to be "of especial interest to students, writers, publishers, editors, librarians, colleges, dental societies, etc." It is described as—

A PLAN BY WHICH SUBSCRIBERS WILL BE FURNISHED A CLASSIFIED CARD INDEX OF ARTICLES IN THE LEADING DENTAL JOURNALS.

At a meeting of the National Institute of Dental Pedagogics, held in St. Louis last December, a committee was appointed to establish a Dental Index Bureau. Briefly stated, it is intended that this committee shall employ a competent person to review and classify all of the articles in ten or twelve of our leading dental journals, and shall furnish to each of the subscribers to the Bureau, at frequent intervals, cards so classified and grouped that the subscriber may easily and quickly find all the articles on any subject in dentistry. These cards will be made on a definite system, by which additional cards may be added as they are received and always go to their proper places; so that no matter how many additions may be made from year to year, all of the cards on each subject will be in a separate group. For example, all of the articles on the subject of filling teeth with gold will be in one group, all on filling teeth with amalgam in another, all on cavity preparation in another, all on alveolar abscess in another, etc.

It is hardly necessary to mention the value of such an index to the wide-awake members of the profession. Journals which may have accumulated, and which are now almost worthless on account of the difficulty in finding articles when desired, will become of service as the index is extended to cover them. The man who has occasion to look up a particular subject, or to write a paper, can find all that has been written on that subject instantly. The grouping of articles on each subject enables one to bring together the views of many writers. Post-graduate courses of study can be instituted by dental societies or undertaken by individuals; the ready reference index will make college libraries of the greatest value to the faculty and to the student body; editors and writers will find their work facilitated, and the results of their study more gratifying to themselves and more highly appreciated by their readers.

The idea of the committee is to organize a permanent society for the purpose of classifying and indexing all dental literature. The present plan is but preliminary to the greater work, which will cost less and less to individual subscribers as the number of members is increased. Those who help to start the work will profit more than those who follow, and will have the satisfaction of participating in one of the greatest advance movements in dentistry.

The subject-matter of several of the leading dental journals has already been classified and indexed by Dr. Arthur D. Black, at a great expenditure of time and money. This index contains about 40,000 cards, cataloging articles in various journals from 1839 to date; but it is not available, for obvious reasons, to the profession at large. Your committee is privileged to copy these cards, should the funds subscribed permit, which would be of great benefit to the subscribers and incidentally to the whole profession.

It is the committee's intention to this year furnish each subscriber with author and subject cards for all original articles, papers read before societies, book reviews, and editorials, in about ten journals for 1908 and 1909—from 4000 to 5000 cards, all properly arranged with all cards for each subject together, with guide cards for each subject and with author cards arranged alphabetically. It is expected that in 1910 the cards will be furnished for the same journals for the years 1907 and 1910; and in 1911 cards for 1906 and 1911. Thus in three years each subscriber will receive cards for these journals for six years—probably 25,000 to 30,000 cards. These cards will be sent in boxes in which they may be kept permanently. The number of journals indexed and the number of cards sent out by the committee, however, will depend upon the number of subscribers.

The preliminary report of this committee, which was made at the St. Louis meeting, gives an outline of the plan. It will be noticed that it is the intention to try this plan for a period of three years, and subscriptions at the rate of Twenty-five Dollars (\$25.00) a year for that period may be sent to any member of the committee.

Subscriptions will be received from individuals, dental journals, dental schools, or dental societies. Any person or group of persons may send in a single subscription, and one set of cards will be sent in return. Subscription blanks may be had from any member of the committee.

Committee for 1909—Dr. W. L. Fickes, Chairman, 6200 Penn ave., Pittsburg, Pa.;

Dr. Arthur D. Black, 31 Washington st., Chicago, Ill.; Dr. Herman Prinz, 603 Century Bldg., St. Louis, Mo.

REPORT of the Committee on Classifying and Indexing Dental Literature, to the Institute of Dental Pedagogics, at the annual meeting, St. Louis, 1908-1909.

The undersigned committee, appointed by the Institute of Dental Pedagogics for the purpose of devising ways and means of classifying and indexing current dental literature, as an evidence of progress presents to the members of the Institute and others interested the following plan:

1. That the subscribers to this plan organize themselves into an association to be known as The Dental Index Bureau.

2. That the above-mentioned committee, appointed by the Institute, will devise ways and means for carrying out the work of the Bureau during the coming year, and will call a meeting at the time and place of the next meeting of the Institute, for the perfecting of a permanent organization.

3. That this committee will employ a competent person to classify as much of the current dental literature as possible, beginning with January 1909 journals, and will furnish subscribers, at frequent intervals, with author and subject cards of all articles classified.

4. That this committee will be guided by a vote of the subscribers in the selection of the literature to be classified.

5. If the funds subscribed will permit, as much as possible of the literature of previous years will be similarly classified and indexed.

W. L. FICKES, *Chairman*,
ARTHUR D. BLACK,
HERMAN PRINZ.

MARYLAND STATE DENTAL ASSOCIATION

AND THE

DISTRICT OF COLUMBIA DENTAL SOCIETY.

A JOINT meeting of the Maryland State Dental Association and the District of Columbia Dental Society will be held in Washington, D. C., October 28 to 30, 1909.

For further information address either of the following:

F. F. DREW,
701 Howard st., Baltimore, Md.
A. D. WEAKLEY,
Washington, D. C.

XI PSI PHI FRATERNITY.

THROUGH the sickness of our brother Fritz Liermann, 25 Goodrich st., Buffalo, N. Y., the publication of our fraternal directory has been delayed, but it will be published not later than November 1st. All members of our fraternity are urged to send their names, year of graduation, chapter, and other items of interest to above address. Please do so immediately and let our next directory be complete in every respect.

Fraternally yours,
FRITZ LIERMANN.

New York Alumni Association of the Xi Psi Phi Fraternity.

THE annual fall meeting of the New York Alumni Association of the Xi Psi Phi Fraternity will be held at the Hotel Astor, Times Square, New York city, on Wednesday evening, October 13, 1909. The meeting will be called promptly at 8 P.M.

As the officers for the ensuing year are to be elected and several important changes to be made in the constitution, it is urgently requested that every alumnus of the Xi Psi Phi Fraternity residing in or about New York city be present.

For further particulars address

J. NORBERT GELSON, *Sec'y*,
673 Vanderbilt ave., Brooklyn, N. Y.

NORTHEASTERN DENTAL ASSOCIATION.

THE fifteenth annual meeting of the Northeastern Dental Association will be held in the Churchill House, Angell st., Providence, R. I., on October 7, 8, and 9, 1909. The officers and committee intend this to be a very interesting and instructive meeting.

E. O. KINSMAN, *Sec'y*,
Cambridge, Mass.

AMERICAN SOCIETY OF ORTHODONTISTS.

THE ninth annual meeting of the American Society of Orthodontists will be held in Cleveland, Ohio, on Monday, Tuesday, and Wednesday, October 4, 5, and 6, 1909.

FREDERICK C. KEMPLE, *Sec'y*,
43 W. 48th st., New York city.

SEVENTH AND EIGHTH DISTRICT (N. Y.) DENTAL SOCIETIES.

THE union meeting of the Seventh and Eighth District Dental Societies of the State of New York will be held in Buffalo, N. Y., at the Hotel Iroquois, October 29 and 30, 1909

WALTER H. ELLIS, *Sec'y.*

CENTRAL PENNSYLVANIA DENTAL SOCIETY.

THE Central Pennsylvania Dental Society will hold their annual meeting on Tuesday and Wednesday, October 5 and 6, 1909, at Altoona, Pa.

The officers are as follows: F. B. Evans, president; J. A. Witter, vice-president; H. A. Wehrle, treasurer, and H. E. Crumbaker, secretary.

H. E. CRUMBAKER, *Sec'y*,
Morrow Blk., Altoona, Pa.

NORTHERN ILLINOIS DENTAL SOCIETY.

THE twenty-second annual meeting of the Northern Illinois Dental Society will be held at Elgin, October 20 and 21, 1909.

Our regular most excellent program is assured. The banquet on Wednesday evening, which is free to all members whose dues are paid, is an innovation from which great pleasure is anticipated. Come and bring a new member with you. Mark the date on your appointment book.

F. H. BOWERS, *Sec'y*,
Freeport, Ill.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

THE following officers were elected at the annual meeting of the National Association of Dental Examiners, held at Old Point Comfort, Va., August 2, 1909: J. J. Wright, Milwaukee, Wis., president; T. E. Turner, St. Louis, Mo., vice-president for the West; A. M. Midgeley, Providence, R. I., vice-president for the East; Starr Parsons, Washington, D. C., vice-president for the South; Chas. A. Meeker, Newark, N. J., secretary and treasurer.

CHAS. A. MEEKER, *Sec'y*,
Newark, N. J.

NATIONAL DENTAL ASSOCIATION.

EXECUTIVE COUNCIL.

A MEETING of the Executive Council of the National Dental Association will be held at the Hotel Hollenden, Cleveland, Ohio, at 10 o'clock A.M., Saturday, November 6, 1909, for the appointment of officers of Sections and the usual committees, and the consideration of such other matters as may properly come before it.

Members of the association having any business to present are requested to attend this meeting.

BURTON LEE THORPE, *President*,
CHARLES S. BUTLER, *Sec'y.*

NEW JERSEY STATE DENTAL SOCIETY.

THE following officers were elected at the annual meeting of the New Jersey State Dental Society held in Newark in July: Chas. H. Dilts, Trenton, president; Wallace F. Naylor, Somerville, vice-president; Henry A. Hull, New Brunswick, treasurer, and Chas. A. Meeker, Newark, secretary.

CHAS. A. MEEKER, *Sec'y*,
Newark, N. J.

ODONTOGRAPHIC SOCIETY OF WEST PHILADELPHIA.

THE next meeting of the Odontographic Society of West Philadelphia will be held Monday evening, October 4, 1909, at 8 P.M., in the Amphitheater of Dental Hall, University of Pennsylvania.

No meetings were held during July, August, and September; this one, being the opening of our fall and winter sessions, will be of unusual interest to all members.

R. R. PARKS, *Sec'y.*

G. V. BLACK DENTAL CLUB OF ST. PAUL.

MIDWINTER CLINIC.

THE members of the G. V. Black Dental Club (Inc.) will hold their midwinter clinic in St. Paul, Minn., February 24 and 25, 1910. For further particulars address

R. B. WILSON, *Sec'y*,
409-10 Am. Nat. Bank Bldg., St. Paul, Minn.

OHIO STATE DENTAL SOCIETY.

THE forty-fourth annual meeting of the Ohio State Dental Society will convene in the assembly rooms of the Great Southern Hotel, Columbus, on December 7, 8, and 9, 1909. The program of papers and clinics will be second to none of those of the past.

A more extended notice will appear in the November number of the *Cosmos*. Mark these dates off your appointment book now, and come prepared to stay through the entire meeting.

F. R. CHAPMAN, *Sec'y*,
305 Schultz Bldg., Columbus, Ohio.

OHIO STATE DENTAL BOARD.

THE Ohio State Dental Board will hold its regular fall meeting in Columbus, on October 19 to 22, 1909, for the examination of applicants for license. All applications should be in the hands of the secretary not later than October 9th.

For further information and blank applications address

F. R. CHAPMAN, *Sec'y*,
305 Schultz Bldg.,
Columbus, Ohio.

DENTAL COMMISSIONERS OF CONNECTICUT.

THE Dental Commissioners of the State of Connecticut hereby give notice that they will meet at Hartford on Wednesday, Thursday, and Friday, November 17, 18, and 19, 1909, to examine applicants for license to practice dentistry. Application blanks, rules, etc., will be forwarded by the recorder upon request.

By order of the Commission,

GILBERT M. GRISWOLD, *Recorder*,
783 Main st., Hartford, Conn.

ARKANSAS BOARD OF EXAMINERS.

THE next meeting of the Arkansas Board of Dental Examiners will be held November 29 and 30, 1909, in Little Rock.

All applicants are required to pass an examination in order to obtain a certificate to practice in this state. No temporary permits. Examination fee, \$15.00.

A. T. McMILLIN, *Sec'y*,
111 E. 5th st., Little Rock, Ark.

MASSACHUSETTS BOARD OF REGISTRATION.

A MEETING of the Massachusetts Board of Registration in Dentistry will be held in Boston for examination of candidates from October 27 to 29, 1909.

Applications and further information to be obtained from

G. E. MITCHELL, *Sec'y*,
25 Merrimack st., Haverhill, Mass.

NEBRASKA BOARD OF EXAMINERS.

THE next regular meeting of the Nebraska Dental Board for the examination of applicants for license to practice dentistry in Nebraska will be held in Lincoln, beginning November 15th, at 9 A.M. All applications must be in the hands of the secretary by November 8th.

H. C. BROCK, *Sec'y*,
North Platte, Neb.

ARIZONA BOARD OF EXAMINERS.

THE next meeting of the Arizona Board of Dental Examiners will be held at Phoenix, in November. For further information address

J. HARVEY BLAIN, *Sec'y*,
Prescott, Ariz.

MARYLAND BOARD OF EXAMINERS.

THE Maryland Board of Dental Examiners will meet for examination of candidates for certificates November 10 and 11, 1909, at the Baltimore College of Dental Surgery, Baltimore, at 9 A. M.

For application blanks and further information apply to

F. F. DREW, *Sec'y*,
701 N. Howard st., Baltimore, Md.

NEW JERSEY BOARD OF REGISTRATION.

THE New Jersey State Board of Registration and Examination in Dentistry will hold its semi-annual meeting in the Assembly Chamber of the State-house at Trenton, N. J., beginning Monday, December 6th, and continuing through the 7th and 8th.

Applicants for examination must file photograph and preliminary credentials with the application or it will not be received. Ses-

sions begin promptly at 8 A.M. each day. Monday, December 6th, will be devoted to practical examination, Tuesday and Wednesday to theoretical examination.

Applications must be filed ten days prior to the meeting.

CHAS. A. MEEKER, *Sec'y*,
29 Fulton st., Newark, N. J.

NEW HAMPSHIRE BOARD OF REGISTRATION.

The next meeting of the New Hampshire Board of Registration in Dentistry, for examination, will be held at Masonic Banquet Hall, Manchester, N. H., December 7, 8, and 9, 1909.

No special examinations. All persons must become registered before beginning practice.

A. J. SAWYER, *Sec'y*,
Manchester, N. H.

ILLINOIS BOARD OF EXAMINERS.

The annual meeting of the Illinois State Board of Dental Examiners for the examination of applicants for a license to practice dentistry in the state of Illinois will be held in Chicago at the Dental Department of the University of Illinois, corner Honore and Harrison sts., beginning Monday, November 8, 1909, at 9 A.M.

Candidates will be furnished with proper blanks and such other information as is necessary on application to the secretary. All

applications must be filed with the secretary five days prior to date of examination. The examination fee is twenty dollars, with an additional fee of five dollars for a license.

Address all communications to

T. A. BROADBENT, *Sec'y*,
705 Venetian Bldg., Chicago, Ill.

TEXAS BOARD OF EXAMINERS.

The regular meeting of the Texas State Board of Dental Examiners will be held in Dallas, Texas, beginning 9 A.M. Monday, December 13, 1909. Diplomas not recognized or registered. Examination required of all. No interchange of license with any other state. No special examination to practitioners already in active practice. Applications, accompanied by a fee of twenty-five dollars, should be in the secretary's hands by December 10th. For further information address

BUSH JONES, *Sec'y*,
Dallas, Texas.

ARMY DENTAL CORPS.

RECENT CHANGES OF STATIONS.

Alden Carpenter: Relieved from temporary duty at Fort Wadsworth, N. Y., and ordered to Madison Barracks, N. Y.

Jean C. Whinnery: Relieved from duty at Vancouver Barracks, Wash., and to proceed to San Francisco, Cal., in time to take the transport sailing for Manila, P. I., about October 5, 1909, for duty in the Philippines Division.

UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING AUGUST 1909.

August 3.

No. 930,082, to O. H. and A. F. PIEPER. Dental engine.

August 10.

No. 930,717, to EDWARD H. ANGLE. Dental tooth-regulating appliance.

August 17.

No. 931,167, to WM. L. WHITE. Lathe chuck release.

August 24.

No. 932,133, to F. O. JAQUES. Machine for contouring crown matrices.

August 31.

No. 932,875, to A. LAVALLÉE and G. J. CONSTANTINEAU. Automatic dental advertising device.

No. 932,896, to O. H. and A. F. PIEPER. Electric motor.



DR. JOSEPH W. WASSALL.

THE DENTAL COSMOS.

VOL. LI.

NOVEMBER 1909.

No. 11.

ORIGINAL COMMUNICATIONS.

THE INTERPROXIMAL SPACE: ITS IMPORTANCE AND PRESERVATION.

By H. E. FRIESELL, D.D.S., Pittsburg, Pa.

(Read before the Dental Society of the State of New York, at its annual meeting, Albany,
May 6, 1909.)

IN a well-formed arch, the approximal surfaces of the teeth are in contact near their occlusal margins, but as the mesio-distal diameter of a tooth is greater at the contact points than it is at the neck, considerable spaces occur between the necks of the teeth. These spaces are known as the interproximal or V-shaped spaces.

The average measurement of the dental arch, from the distal surface of the right third molar to the distal surface of the left third molar, on the line of the contact points, is given by Dr. Black as 127 mm. (5 inches); the average measurement of the sixteen teeth at their necks is about 89 mm. ($3\frac{1}{2}$ inches), the remaining 38 mm. representing the average measurement of the interproximal spaces, taken collectively.

The preservation of the ideal size and form of these interproximal spaces is imperative—

First: If sound approximal surfaces are to be protected from caries.

Second: If approximal fillings (perfectly made otherwise) are to prevent recurrence of decay.

Third: If the interproximal gum tissue is to remain comfortable and healthy.

It is a truth, pretty generally accepted by the dental profession today, that caries never commences on tooth surfaces that are actively scoured by the food in mastication; or in other words, decay never begins on a clean surface. It is also recognized that decay does not begin under healthy gum tissue, and that on an unclean surface decay stops at the gum line, never passing beneath the gum on the surface of the enamel.

Owing to their varying contour, we find that the larger portion of the approximal surfaces of the teeth belongs to the class of *unclean surfaces*, whereon caries will begin unless they are kept

covered by healthy gum. We also find that the normal interproximal space is filled with healthy gum tissue, thus protecting these otherwise susceptible areas from the encroachment of caries.

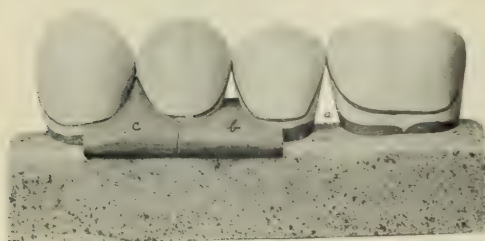
So long as the interproximal space is filled with healthy gum, decay will not begin there. When anything interferes with this condition, and decay attacks the approximal surfaces, if the cavities be properly filled and the interproximal space properly contoured, the gum tis-

which are given a V-shape by the rounding out and divergence of the two approximal surfaces as they pass from the point of contact toward the buccal and the lingual surface.

It should be noted that the apex of the vertical V and of each of the two horizontal V's is a *point*.

Owing to the greater convexity of the approximal surfaces of the bicuspid, their interproximal spaces are larger than are those between the incisors, and the

FIG. 1.



Buccal view of model of teeth, process, interproximal space, and gum tissue. *a*, Interproximal space. *b*, "Meat hole," showing flattened gum septum. *c*, Interproximal space normally filled with gum tissue.

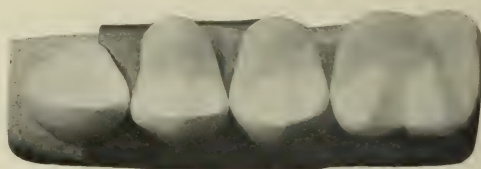
sue will again fill this space and decay will not recur.

IDEAL FORM OF INTERPROXIMAL SPACE.

This gives rise to the question, What is the ideal form of the interproximal space, and what conditions cause alterations in its form, or the loss of its gum tissue?

Viewed from the labial, the buccal, or the lingual side, with the soft tissues removed, the interproximal spaces are seen to be V-shaped, the base of the V being formed by the crest of the alveolar process, while the apex is at the contact point. (Fig. 1.) Viewed from the occlusal aspect, each space is seen to be divided by the point of contact into two spaces, opening toward the buccal and the lingual respectively. These are known as the buccal and the lingual embrasure. (Fig. 2.) They are horizontal spaces,

FIG. 2.



Buccal and lingual embrasures as seen from the occlusal aspect.

molar spaces are somewhat larger than those of the bicuspid.

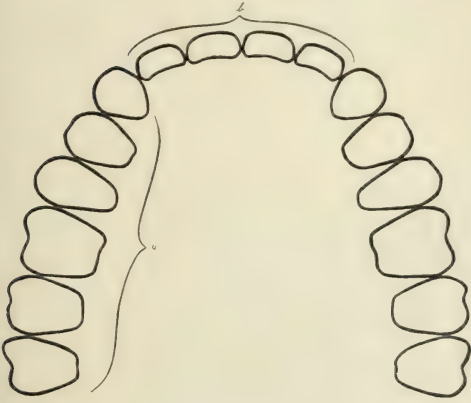
The points of approximal contact are located close to the occlusal surfaces, and on the bicuspid and molars they are placed much nearer to the buccal than to the lingual (Fig. 3, *a*), thus rendering the lingual embrasures on the bicuspid and molars larger than their buccal embrasures. As the incisors curve around the arch, it will be seen that their contact points are placed closer to the lingual than to the labial surfaces, thus rendering their labial embrasures larger than their lingual. (Fig. 3, *b*.)

The mesial and distal boundaries of the interproximal space are formed by the approximal surfaces of the crowns of the teeth and that portion of the roots which may be protruding above the alveolar process.

If the mesio-distal diameter of the teeth be shortened through decay or wear of their approximal surfaces, the teeth will, through the force of mastication, move toward each other until the most

prominent parts of their approximal surfaces are again in contact. This moving

FIG. 3.



a, Contact points near buccal, showing large lingual and small buccal embrasures. *b*, Contact points near lingual, showing large labial and small lingual embrasures between the incisors.

together of the teeth is accomplished at the expense of the interproximal space,

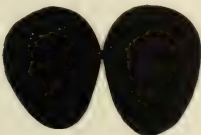
FIG. 4.



"Surface" of contact.

and just in proportion as this space is lessened, the crest of the interproximal

FIG. 5.



"Point" of contact.

gum tissue will be lowered, and more of the area of approximal enamel will be exposed to the action of caries.

The ideal form of contact point is a very small point, rounding away in all directions. It should not be a contact surface (Fig. 4), but should resemble the contact of two marbles or spheres. (Fig. 5.) Many teeth are formed with surfaces of contact instead of points, which is a faulty development, and these teeth suffer more from approximal decay than do teeth that are of better form.

NORMAL WEAR OF CONTACT POINTS.

On account of the slight movement of the teeth in their sockets during mastication, they rub forcibly against each other at their points of contact, and while this wear is very slow, it amounts to considerable in a period of years. In some cases as much as a centimeter (two-fifths of an inch), is lost in this way, from the shortening or flattening of the contact points. In middle-aged and older persons this condition frequently presents a grave aspect, inasmuch as food matter is caught between the flat contact surfaces and forced down upon the interproximal gum tissue in such a manner as to cause great discomfort, and to seriously interfere with mastication, even though there be no cavities in the teeth. If the operator has a sufficient knowledge of the proper shape and position of contact points, and will separate such teeth and make these contact points, he will find the source of discomfort removed, the dental apparatus restored to usefulness, and a very grateful patient.

No matter how thoroughly the other steps of an approximal filling may be performed, if the full mesio-distal breadth of the tooth is not restored by making properly shaped contact points, the filling cannot be considered perfect.

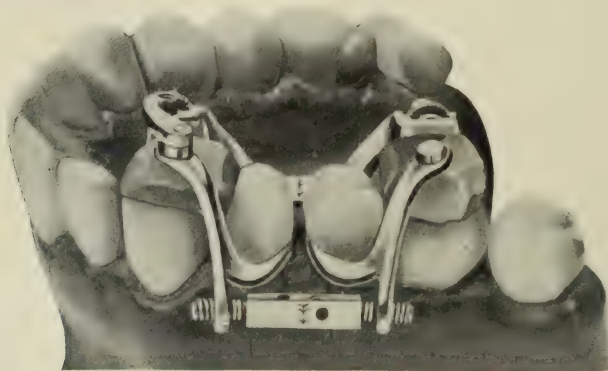
When restoration of the approximal surfaces is needed, separation must generally be secured, and your essayist takes this opportunity to state that the members of the dental profession owe a debt of gratitude to one of the members of your society, Dr. S. G. Perry, for the separator he has given us. In the writer's opinion this is the only separator that can be applied with safety and conveni-

ence, and its use in approximal work is indispensable. The accompanying model shows the separator in position, the teeth having been lifted apart sufficiently to permit full restoration and to allow for a little additional space for finishing the filling. (Fig. 6.)

to become relaxed, and eventually to recede, leaving interproximal spaces not filled with gum tissue, and the approximal surfaces, therefore, liable to the attack of caries.

The deposition of calculus; the careless use of instruments in its removal;

FIG. 6.



Model with Perry separator in position, showing bows supported by gutta-percha and teeth separated sufficiently to allow for full approximal restoration and finishing.

GUM TISSUE SHOULD FILL INTERPROXIMAL SPACE.

Normally the interproximal spaces are filled with gum tissue, and this is the case where the proper space is maintained, provided the attachment of the soft tissues is not interfered with by pathological or mechanical interference. In this connection it should be remembered that the normal space is dependent upon the full, rounded contact point. (Fig. 1, c.)

The gum tissue which fills the interproximal space is a continuation or prolongation of that which covers the buccal and the lingual surface of the alveolar process. It contains many bundles of fibers from the periodontal membrane, which hold it tightly against the tooth surface. The inner ends of these fibers are attached to the cementum as far crown-wise as the gingival line (the junction of the cementum and the enamel). Anything that interferes with the attachment of these fibers at the gingival line will allow the interproximal tissue

the encroachment of an improperly contoured crown band; the faulty trimming of a root for crowning; cavity outlines cut past the gingival line; excess of filling material left overhanging the gingival wall of a cavity; careless or rough use of finishing instruments in trimming approximal fillings to form—each of these things is liable to cut off the supporting fibers of the interproximal gum septum and cause it to recede.

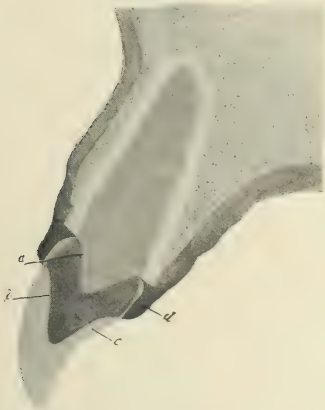
DISTINCTION BETWEEN GINGIVAL LINE AND GUM LINE, GINGIVAL MARGIN AND GUM MARGIN.

That this unfortunate condition may not be brought about through the oversight or carelessness of the operator, an intimate knowledge of the position of the gingival line and of the normal gum line is desirable. By gingival line is meant the line of junction of the enamel and the cementum; the gum line is the occlusal extremity of the gingiva, or gum tissue. The soft tissue extending from the gingival line to the gum line is known

as the free gum margin, or gingiva; the enamel surface that is covered by the free gum margin is called the gingival margin. (Fig. 7.) All operations performed on the unclean portions of the axial surfaces of the teeth should be extended to the gingival of the gum line (*i.e.* under the free gum margin), but they should never reach the gingival line,

passes through the buccal embrasure, and less abruptly as it passes through the lingual embrasure. This line marks the division of the clean and the unclean surfaces of a tooth, and for want of a better name I have called it the *height of contour*. Normally, the gum tissue will extend practically to this line. Thus we have the interproximal gum tissue fill-

FIG. 7.



a, Gingival line. *b*, Gum line. *c*, Gingival margin. *d*, Gum margin (in section).

nor should the attachment of the gum tissue at that point be interfered with in any way by the operator. Thus the gingival portion of the work will be covered and protected from decay by healthy gum tissue which has not been relaxed by interference with the attachment of its supporting fibers.

HEIGHT OF CONTOUR.

If a line be drawn around the axial surfaces of the crown of a tooth, following the point of greatest lateral diameter, it will be seen to vary from the horizontal quite markedly. On the buccal and the lingual surfaces it will be concave from the occlusal, approaching generally quite close to the gingival line. On the approximal surfaces it will be convex, and will reach its crest at the contact point, sloping rapidly toward the gingival as it

FIG. 8.



Approximal view of normal gum septum, filling the interproximal space to the height of contour. The crest of the gum septum is directly beneath the contact point.

ing the space in the form of an unequal-sided V, when viewed from the mesial or the distal aspect, the crest of the V being at the contact point, the long arm sloping toward the lingual and the short arm toward the buccal. (Fig. 8.)

An interproximal space filled with a gum septum of such shape, and protected by two round contact points, offers the ideal protection to the approximal surfaces of the teeth. Fibers of food matter forced into the interproximal space in mastication will be broken by the contact point and diverted toward either the lingual or the labial embrasure, and swept clear thereof by the succeeding mass of food forced through the embrasure. Should the fibers pass the contact, the latter, if small—if a real contact *point*—will not hold them, but will permit the succeeding mass of food to carry them out toward the lingual or the buccal surface. On the other hand, if the contacts be broad and flat—surfaces instead of points—food fibers will be more readily caught between them and will not be drawn out by the sweep of food through

the embrasures, but will gradually be pressed down by succeeding fibers and become impacted on the crest of the gum septum, crowding it away and leaving it flattened (Fig. 9), forming what has been

FIG. 9.



Approximal view of interproximal gum septum flattened by the impaction of fibrous food matter that has been caught between flat contacts and forced against the gum, causing it to recede and leave exposed a portion of tooth surface that is normally covered by the interproximal gum tissue.

very aptly termed "meat holes," the evacuation of which, by the use of a clumsy toothpick, usually continues the destruction of the interproximal gum tissue, and leaves the approximal surface inviting

FIG. 10.



a, Normal interproximal gum septum viewed from buccal aspect. b, Flattened gum septum.

colonization by caries fungi. (Figs. 1, b, and 10, b.)

The late Dr. Harlan, many years ago, called attention to our very general lack of knowledge of the intimate anatomy of the teeth. That the criticism is to

some extent true today is indicated by the numerous examples of failure on the part of operators to properly restore the form of lost tooth structure, to observe the proper relationship between the teeth and the soft tissues, or to recognize the variations in the line of junction of enamel and cementum.

VARYING CURVATURES OF THE GINGIVAL LINE.

The gingival extremity of the enamel does not pass in a horizontal line around the tooth, as might be inferred from the root preparation and the crown work frequently seen. In fact, the divergence from the horizontal is, on certain teeth, very much greater than would be supposed by one who has not been a careful observer of such things. Viewed from the occlusal side, the gingival line, as it passes around the tooth, is concave on the buccal, labial, and lingual surfaces, and convex on the mesial and distal, this approximal convexity being much greater on certain teeth than on others. For example, the average length of the central incisor crown, from the gingival line on the labial surface to the cutting edge, is ten millimeters, while on the mesial surface, the gingival line approaches the cutting edge three millimeters closer, in rare cases this curvature being four millimeters in extent.

On the other upper teeth the curvature of the gingival line toward the occlusal on the approximal surface is, on an average, as follows:*

Lateral	.....2.8 millimeters.
Canine	.....2.5 "
First bicuspid	.....1.1 "
Second bicuspid	.....0.8 "
First molar	.....2.2 "
Second molar	.....1.6 "
Third molar	.....0.7 "

Note the gradual decline of curvature from central to second bicuspid, and the decided increase in the first molar.

* The figures given are taken from Black's "Dental Anatomy."

The lower teeth present the following gingival curvature, viz:

Central	2.5	millimeters.
Lateral	2.5	"
Canine	2.9	"
First bicuspid	0.8	"
Second bicuspid	0.6	"
First molar	1.1	"
Second molar	0.2	"
Third molar	0.2	"

The upper centrals and the lower canines present the greatest curvatures.

Note which teeth cannot be trimmed flat bucco-lingually for crowning without injuring the attachment of the peridental membrane and interproximal gum tissue.

INJURIOUS OPERATIONS.

Many practitioners do not appreciate this curvature of the gingival line, and

FIG. 11.



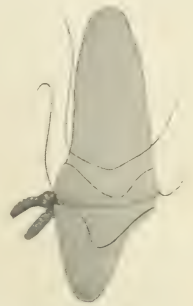
Improper application of ligature. (Black.)

in operating cause much harm to the tissues at this point. In fact, irremediable injury more frequently results from non-observance of these conditions than we would care to acknowledge. Who can tell how many incurable diseases of the gum tissue or of the peridental membrane are started by the drawing of a ligature tightly around a tooth, causing it to impinge upon the peridental membrane at its approximal crest. (Fig. 11.)

If a scaling instrument is thrust through the interproximal space in the manner indicated in Fig. 13, is the condition of these parts made better or worse by the operation?

If a wedge separator is used which creeps down and encroaches on the gum tissue as it is tightened, is it any wonder that occasionally permanent injury is done to these tissues?

FIG. 12.



Proper application of ligature. (Black.)

If a marginal overhang of filling or inlay is left at the gingival, how can the free interproximal gum tissue be healthy and fill the space?

If the operator depends upon the use of strips and files for finishing these approximal surface fillings, is it any wonder that he frequently succeeds in

FIG. 13.



Improper application of scaling instrument.

removing not only the excess of filling material, but much of the interproximal gum tissue as well?

It is the writer's belief that all dental operations involving the approximal sur-

faces of the teeth should be performed in such a manner as to cause no injury to the soft tissues, and to leave a normal interproximal space filled with healthy gum tissue to the height of contour. That portion of these surfaces which lies to the occlusal of the height of contour is scoured by the food in mastication, and decay will not begin upon it. It is a clean surface, and immune to caries so long as there are no faults in its enamel.

IMPORTANT STEPS.

The important steps peculiar to approximal operations would then seem to be:

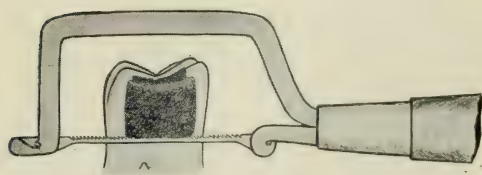
(1) Sufficient separation of the teeth involved to permit of a proper interproximal space.

(2) The making of contact points of such prominence that they will hold the

separation desired is not greater than can be obtained by the compression of the periodontal membranes of the teeth to be separated, there is no instrument so well adapted for this purpose as the Perry separator, which is shown on the accompanying model. (Fig. 6.)

This separator consists of two sets of claws, which clasp the two teeth that are to be separated and lift them apart. These claws permit of adjustment buccolingually and mesio-distally. They are first adjusted bucco-lingually, so that they are clear of the cavity outlines and thus out of the way. Then the teeth are lifted apart by turning a bar containing a right and a left thread. On account of the inclined plane formed by the approximal surface of a tooth as it extends toward the gingival, the tendency of the claws of all separators is to slide toward the gingival and to impinge

FIG. 14.



Application of thread saw in Black saw-frame for removing surplus of filling material at gingival margin. (Black.)

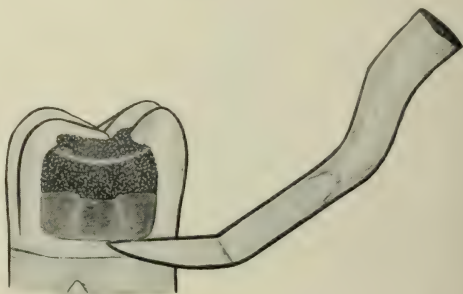
teeth apart and maintain this space, and yet of such small contact as to prevent fibrous food matter from being caught between them and thus crushing down on the gum septum.

(3) The finishing of the approximal filling by methods that avoid injury of the gum tissue and leave the approximal space so contoured as to invite the gum tissue to grow into it and fill it, covering all of the unclean approximal surfaces.

Let us consider each step in detail:

First: To accomplish this requirement, if extensive separation is necessary, the cavity may be filled overfull with base-plate gutta-percha, and the impact of the occluding teeth will, in a few weeks, produce the desired result. If the

FIG. 15.



Application of knife for shaving away very slight excess of filling material. (Black.)

on the soft tissues. The Perry separator has two bows connecting the buccal and lingual claws. These bows pass over the occlusal surfaces of the teeth, and if a ball of gutta-percha is heated and placed under each bow, and allowed to cool before the separator is tightened, the claws will be prevented from creeping toward the gingival, which is a point of great importance.

Second: The making of a prominent approximal contour is provided for when proper separation is gained. The secret of making a small contact consists in

finishing away all portions of the filling that would tend to broaden the contact, and is treated in the next step.

Third: Much of the injury to soft tissues which frequently accompanies the finishing of approximal fillings may be avoided if the finishing saw and the knives are used for this work, as taught by Dr. Black and as shown in Figs. 14 and 15, taken from Black's great work on Operative Dentistry. A "thread" saw is introduced through the approximal space, with the teeth pointing toward the occlusal; the adjustable saw frame is attached, and most of the *excess* material between the gingival outline of the cavity and the contact point is very quickly and easily removed by a few cuts of the saw. This is followed by the finishing knives, which are very sharp, and which shave off the remaining excess very conveniently and with much less annoyance to the patient than is caused by the use of coarse strips or files. The balance of the finishing may be done with suitable files, disks, and strips. No disk is permitted to pass the contact point, and only the very finest strip is used sparingly for polishing it. In this manner no injury need be caused to the interproximal gum

tissue, and yet the surface is very quickly and thoroughly finished; and these surfaces are left in such condition that a healthy gum fills the interproximal space, and there exists no cause of discomfort to prevent the use of the teeth in active, forceful mastication, without which result dental operations are a failure.

To summarize briefly:

The integrity of the approximal surfaces, or of operations thereon, as well as the comfort of the teeth and of the soft tissues, depends greatly upon the filling of the interproximal spaces by healthy gum tissue.

The filling of these spaces by healthy gum tissue depends upon the maintenance of the proper space, which is in turn dependent upon properly placed and shaped contact points, and upon the normal attachment of the gum tissues at the gingival line.

In order that the tissues of the interproximal space may be preserved, or if lost may be restored, it is imperative that the variations in position of the normal gum line and of the gingival line be given more careful consideration than is generally accorded to them.

ROOT-CANALS.

By J. R. CALLAHAN, D.D.S., Cincinnati, Ohio.

(Read before Section II of the National Dental Association, at the annual meeting, Birmingham, Ala., March 29, 1909.)

OF the viscera responsible for the more obscure cases of nervous and mental derangement, I have no hesitation in designating the teeth as the most important, the two most important lesions being impaction and abscess.

"The object of dentistry is the conservation of the tooth for mastication and ornament. Pulpless teeth were formerly filled, the main pulp-chamber being plugged and the roots left open. It was

found that abscess was practically invariable in the course of some years at the roots of such teeth. Modern practice is to fill to the end of the roots as nearly as may be. To estimate the proportion of success and failure of this procedure it will be necessary to consider in brief the course of events in these cases. The process is in effect a battle between the germs and the blood.

"The germs, practically always present

in spite of the greatest care and skill, march down the hollow of the tooth by multiplication, often requiring several years to cover the distance to the end. Once out of the opening and in the jaw-bone, they are like a squad of soldiers with their backs against a wall. The forces of serum or the white blood cells can only attack in front with an effectiveness diminished by half, and even if successful for a time, more germs are always lurking in absolute safety in the dead tissues of the tooth. If to prevent this condition filling material is pushed to the end of the root and a little of it forced through into the jaw, an irritant is in contact with the tissues, and in most cases bacteria accompany it. If, on the other hand, it falls a thousandth of an inch short of the opening, the tiny germs find ample space for lodgment.

"A man is as old as his arteries, and his arteries are approximately as old as the combined action of suppurative and other toxins has made them in the preceding years. Oral sepsis is not all superficial. Its most important location is usually deep in the jaws. In probably no other part of the body can purely irritative lesions be studied in contrast with suppurative ones and toxemia, and the symptoms of each condition be followed with accuracy. Impactions result in pure irritation; dental caries in irritation with a minimum of toxemia; abscesses begin in irritation, and result, when large and multiple, in chronic intoxication. The preservation of dead teeth is of doubtful value. Suppuration may occur about well-filled teeth, and even about teeth that are unfilled and undecayed; it is almost inevitable about bad teeth, and the one sure method of treatment is extraction—which may, however, in many cases be reserved until after the trial of conservative measures. The ominous conjunction of multiple abscesses with the triad of cardiac, renal, and vascular diseases is casually noted in several of the cases reported in this series and in some others. To exclude suppuration as a factor in these cases skiagraphs are absolutely necessary.

"Many other lesions are potent in caus-

ing irritation. Fillings which encroach upon the soft tissues or bones are often revealed by skiagraphs, and thus can be remedied. It is only possible for me at present to make the broad statement that irritation and septic poisoning should be removed in every case, and that local results of dental lesions are trifling in comparison with their profounder effects on general health."

The above is taken from a recent medical work on insomnia and nerve-strain, and is made use of here as a text to show that the dental profession is to be held to account, by both the medical profession and the laity, for the deplorable suppurative conditions to be found in the mouths of many of our patients.

This quotation tends to disprove the statement so often made on the floor at many of our meetings that the medical man knows nothing about dental conditions. It also serves notice that the forceps are to return to a prominence that will be distasteful to many of us, unless we can show better results in the treatment of the class of cases referred to.

I believe that every thoughtful dentist will agree in part at least with Dr. Upson when he says: "Of the viscera responsible for the more obscure cases of nervous and mental derangement I have no hesitation in designating the teeth as the most important"; and, personally, I believe that suppurative conditions of the mouth play an important rôle in various forms of intestinal toxemias.

If half of what has been said be true, no apology is necessary for bringing the old story of root-canal treatment before so dignified a body as the National Association. It is hardly necessary to say that the present results of root-canal treatment are not always satisfactory.

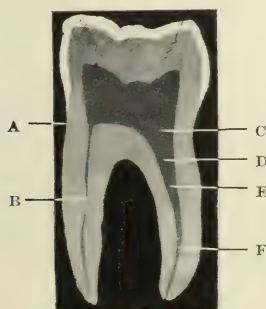
Since the time of Pierre Fauchard (1733) up to the present time we have been hammering away at this subject, but notwithstanding the immense amount of commendable and scientific progress that has been made, we seem to neglect or evade or fail to recognize, or give up in despair, the key to the situation. I refer to the extreme or last one-eighth of an inch of canal near the apex of the

root, or that portion of the canal that passes through pure or almost pure cemental tissue.

In the normal mouth we may expect to find about fifty-six canals. Twenty-eight of these are usually large, straight, and easy of access, seldom constricted, open as a rule, so that fifty per cent. of the roots, if occasion require, should with comparatively little effort be thoroughly treated and successfully closed, showing no subsequent inflammation, if the teachings of Dr. Buckley are followed closely.

In cases of tortuous small canals, with single or multiple foramina, and an apex covered with cementum or abnormal growth, it is many times seemingly impossible to find the canals; yet it will be found that by somewhat complicated procedures and in two or three sittings these seemingly impossible cases can be successfully treated.

FIG. 1.



In order to develop the technique that I wish to consider, we select a lower left first molar, from which we grind the buccal surface of crown and roots sufficiently to disclose the pulp-chamber and canals. (See Fig. 1.)

Let us say here that the skiagraph would be of inestimable value at this time, and should be made use of at almost every stage of root-canal treatment; but this is not yet practical except in a very few offices, and consequently I shall make no further mention of this important aid.

I should add that we are not discussing putrescent conditions, further than to say that as a rule I would not begin

opening these canals until the preparatory treatment as advocated by Dr. Buckley has been followed out.

The anterior buccal canal presents an abrupt or square entrance, and therefore is not easy to locate or easy to enter when found. (Fig. 1, A.) A No. 5 Donaldson broach is finally passed as far as B on the diagram, where it meets with a constriction. Below this point, we have reason to believe that the constricted canal contains fragments of dead pulp tissue or a minute blood-clot in a more or less disintegrated condition, which even though mummified to the best of our ability and sealed in this position, will finally, in from one to five years, under the influence of the secretions of the body, become food for some itinerant microbe. These pulp fragments should be removed and the canal be put in such condition that drugs and filling materials may reach the apical foramen with the greatest degree of ease and accuracy. To this end the mouth of the canal should be enlarged, constrictions and curves made easier, and its general shape should be that of an attenuated funnel. With a Gates-Glidden drill as large as conditions will permit, we start the funnel shape at the mouth of the canal (C), being careful to have the canal as dry as possible, for it is in the wet canals that the drills lock and break. Be careful to allow the drill to go only far enough to make a pocket, say, of a depth equal to half the length of the head of the drill.

A smaller Gates-Glidden drill will then go a little farther into the canal (D), the operator being careful to stop short of a curve. Then place a drop of forty per cent. sulfuric acid in the pocket; next, with the largest Donaldson broach that will enter the canal at the extremity of the pocket thus made (E), begin pumping, enlarging the canal to the size of that broach as far as possible. Then repeat the process, using this time a smaller broach (F), keeping fresh acid in the canal and continuing the gentle manipulation of the broach until an obstruction is met with.

Then, with cotton or a small syringe,

introduce into the cavity a saturated solution of sodium bicarbonate, and note what happens. If there be sufficient acid in the canal, enough carbonic acid gas is manufactured to cause a series of rapid and easily noticed explosions, coming from the very end of the canal, carrying every particle of débris out of it, leaving it cleaner than it can be made by any other practical procedure.

The obstruction met with consists either of cementum at the apex of the root or of pulp tissue rammed ahead of the broach. At this point it may be pertinent to inquire as to what has happened to the minute fragment of pulp tissue in the remaining twentieth of an inch of the canal at the apex. It is reasonable to suppose that the acid by the time it reaches this point is neutralized a little at least, and that the pulp fragments have been changed somewhat, carbonized slightly and somewhat hardened, but are still freely soluble in the presence of sodium-potassium.

The enlarging, straightening, and smoothing of the canal, as above described, enables us to carry on a worn No. 5 Donaldson broach small particles of sodium-potassium to these pulp fragments with a reasonable certainty that they will be dissolved or broken up by the strong alkali. Then the soapy residue should be gotten rid of, lest, if left in the apex or apical space, it would in time be so changed that it would become attractive to germ life. Such is the uncertainty of getting water to it with sufficient force that I have made a second application of sulfuric acid followed by a sodium bicarbonate solution, with the idea that the liberation of the resultant carbonic acid gas would free the canal of every deleterious substance.

Then seal a mild or light dressing of Dr. Buckley's cresol and formalin in the canal for a day or two, when most likely the canal will be ready to be filled.

The opening of the anterior canals will of course be more difficult or perhaps impossible, but persistent and patient effort will often bring the desired results, by the use of sodium-potassium whenever pulp tissue blocks the way, and of sul-

furic acid when bony tissue interferes with easy access to the apex. Twenty years of constant use of the acid method has convinced me that the dissolution of a small portion of bony structure surrounding pulp-canals is not only harmless to the tooth, but is an absolute necessity, to the end that a direct and unobstructed smooth passageway to the apical region may be obtained, thus facilitating and rendering certain the penetration of medicaments and canal fillings to the end of the root.

During the years that sulfuric acid has been used in root-canal treatment but three objections have been brought forward that deserve discussion. First, it is said that many broaches are broken off in canals owing to the action of the acid on the steel. It is true that the broach does become brittle, but breakage is usually the fault of the operator. Most likely he has been punching at the canal at an angle, instead of in line with the canal, when such an accident does occur. If the canal be filled with acid at once and the soda solution thrown in, the fragment of the broach will be forced out of the canal by the gas explosion, provided of course that the broach has not been rammed deeply into the canal by extreme force. In this case it will be well to pack the canal over and about the broach with crystals of iodine and to seal it tightly for a day or two, when the steel will be converted into iodide of iron, which can be removed.

The second objection offered is that the acid destroys the bone-matrix. This it seems to me is just why we use it, with the qualification, however, that its solvent action is practically self-limiting, or sufficiently so that it is easily kept under control.

Thirdly, it is said that sulfuric acid in 40 per cent. solution, if allowed to escape through the foramen, will set up a state of violent irritation. Yet the very men who raise this objection apply 2 to 50 per cent. formalin solutions to canals, or sodium dioxide, sodium-potassium, or carbolic acid. If we place a liberal dose of any of the above drugs about the necks of teeth on one side of

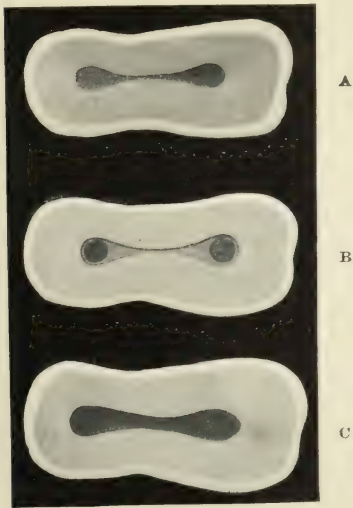
the mouth, and treat the other side in like manner with 40 per cent. sulfuric acid, we shall find that as an irritant H_2SO_4 is not in the race for a minute. In fact, the stimulant, astringent effect makes H_2SO_4 in 40 per cent. solution a valuable remedy in highly inflamed and congested areas for starting granulation. As an available antiseptic it has no superior.

The removal of all débris from the canal is a point that I feel has not re-

have been removed. It is impossible to remove this clinging mass in any other way than by the use of sodium dioxid, sodium-potassium, or sulfuric acid and soda solution. (See Fig. 2, c.)

The H_2SO_4 treatment has the advantage of removing bone spicula, of being less caustic to delicate membranes, of consuming about one-tenth as much time in its application, and of leaving the walls of the canal smooth for filling. (See Fig. 1, c to f.)

FIG. 2.



ceived the attention which it deserves. In most of the broad flat roots, the anterior roots of lower molars or the root of the upper first bicuspid, where we find both a buccal and a lingual root-canal, close inspection will show that nearly always the two canals are connected by a flat narrow space filled with dead tissues of one kind or another that need to be cleansed away. In Fig. 2, B, the root has been treated with instruments alone, such as drills or broaches, and has possibly been opened clear through to the apex; yet the walls and the thin flat space between the canals are still packed with dead tissue. (See Fig. 2, B; also Fig. 3, longitudinal section.) The figure shows that a hole has been drilled through the mass of substance that should

FIG. 3.



Having the canal prepared, and taking the posterior canal as shown in Fig. 1 as our ideal, it is plain that any liquid or semi-liquid substance that may be placed in the funnel-shaped mouth of the canal at c will find its way to the spot which we are trying to reach. In an upper tooth, of course, it will need some assistance.

Dr. Broomell of Philadelphia has recently given us a most excellent and helpful book under the title of "Practical Dentistry by Practical Dentists." In chapter viii, under the heading of "pulp-devitalization," we find seventeen different ways of destroying this wee bit of anatomy. Under "pulp-extirpation" we find thirty-six plans for the removal of the corpse. Under "root-canal treatment" we find fifty-one different procedures, any one of which may be thought the best. Under "root-canal filling" we find seventy-one methods for sealing canals and keeping them forever sweet and clean. And yet we are not happy! Under the head of "treatment of pulps

and pulp-canals," miscellaneous, we have sixty-six preparations, each one more potent than its predecessor. Under the heading of "root-canal treatment in deciduous teeth" we are given thirty-nine different ways, and the author intimates that he may have overlooked a few. Total, 280 prescriptions and procedures for one poor sick little tooth!

With all this advice, is it to be wondered at that the busy practitioner frequently changes his mode of root-canal treatment? Of the seventy-one methods for the filling of root-canals, is there any one that can be said to be perfect? I think not.

Like many others, I was attracted for a short time by one of the zinc oxid. formalin, and other ingredients—cement compounds that are so extensively advertised for root-canal filling. A brief trial has convinced me that they are not so good as they look. They do not show clearly in the radiograph. They are porous, they disintegrate in the presence of moisture, and are more or less irritating to the tissues beyond the foramen. The canals of some twenty extracted teeth were filled with several of these compounds and white gutta-percha cones, and after letting them set or harden overnight, the teeth were covered with hot wax except at the apical foramen. They

were then placed for two hours in water colored with anilin pigment to a bright red. The teeth were then ground with a carborundum wheel until each canal was exposed. This showed the cement canal-filling substance to be stained well into each canal, proving, in my opinion, too great a porosity to be trusted in a root-canal for any length of time.

These same teeth were placed overnight in a moist chamber, the moisture being supplied by a piece of wet cotton about the bulk of a molar tooth. The cement substance showed a decided softness. This simple test, along with other conditions noted, caused me to return to my old favorite, chloro-percha and red gutta-percha cones in the apical third, as nearly as possible, of all canals with open foramina; the pulp-chamber and the remaining portion of the canals, including canals that are not open through, being filled with zinc oxychlorid. After placing the gutta-percha, the cone should be packed in the canal with a cold instrument, after softening the gutta-percha with hot air.

All medical and surgical treatment should be varied or adjusted to meet the requirements of the numerous idiosyncrasies and physical conditions of the individual patient. This, however, is "another story."

THE ALL-PORCELAIN JACKET CROWN.

By R. H. RIETHMUELLER, Ph.D. Univ. Pa., and HORACE HOUGH.

THE progress of dentistry as a science has been marked by an accentuation of the relationship between the oral cavity with its contents and the general health of the human system, whereby dentistry has been raised above its former level of a purely mechanical art, and has become a branch of medicine general. Hand-in-hand with this development of principles has gone a perfection of the

operative means and technique, so that what formerly was merely a handicraft has now become an art in the full sense of the term.

THE ESTHETIC PHASE IN CROWN RESTORATIONS.

This esthetic phase of dentistry has been developed and advocated within a

comparatively recent time. The utter lack of consideration of the artistic and the woful absence of the esthetic eye was still evinced ten years ago, when dentists put unsightly gold crowns on canines and even incisors, the unfortunate though sometimes quite proud bearers of which still abound, shocking our sense for the beautiful, and making us wonder what excuse the "skilful" dentist who committed such atrocities might have to offer. Fortunately, within the last ten years dentistry has shed these unsightly feathers that were the remnants of the gay plumage of medieval charlatanism. In some countries, and strange to say not only among savage tribes who, like the Filipinos and the Igorots, have embraced the opportunity of their visits to American exhibitions to have shining gold crowns put on ideally healthy front teeth, the practice of the visible gold crown is still in vogue. Fortunately, in America, intelligent people of good taste and ethical dentists have almost entirely drifted away from the use of such unsightly decorations.

The awakening of the profession to a realization of their duties in regard to the preservation of natural perfection and appearance was immediately followed by a flood of more or less suitable filling materials, the manufacturers of which were aiming no less at natural than at chemical and physiological perfection. To their efforts the origin is due of the legion of cements, artificial enamels, and porcelains, with all the blessings which they have bestowed upon the dental patient and profession; the imperfections which still adhere to the manipulation and the durability of these various materials are minimal if compared with their merits.

OBJECT OF AND INDICATION FOR THE ALL-PORCELAIN CROWN.

The object of every restoration in front teeth that have decayed beyond the possibility of retaining a lasting filling is to re-establish correct anatomical relationship, to prevent recurrence of ca-

ries, and to attain the most beautiful, that is natural, appearance. Various devices have been advocated for this purpose, the merits or shortcomings of which lie outside of the subject of this paper. Undoubtedly no other device fulfils so nearly the requirements indicated above as the all-porcelain jacket crown.

The only two objections that might be raised against this crown are, first, its questionable durability. This objection will become invalid, even to the mind of the most skeptical, after reading the reports of practical cases printed below in which this crown has stood the severe test of time for six years.

The second objection that might be raised is the necessary delicacy which the making of a perfect porcelain jacket crown requires as regards the selection of the correct shade and the anatomically correct sculpturing of the tooth form. Since the studies on the coloring of porcelain have appeared from the pens of such conscientious and scientific investigators as Gilbert and Fickes, this objection, too, is untenable. On the contrary, the all-porcelain jacket crown is a valuable educational factor in teaching the practitioner the difficult selection of suitable shades which is so important in artificial dentures, and in imparting to his hand the needed skill for carving anatomically perfect tooth shapes.

The all-porcelain jacket crown has a slightly limited field of application, yet it fulfils a mission in that portion of the mouth which affects the speech and facial appearance of the patient most vitally, thus supplying a great need, as none of the heretofore employed means of restoration have proved entirely satisfactory. For deciduous teeth, the all-porcelain crown, being a permanent restoration, is not indicated. It is especially valuable for restoring carious incisors, canines, and bicuspid which have become too frail to support a gold filling, and discolored teeth which owing to spontaneous death of the pulp have become a danger involving pericemental inflammation, apical suppuration, and abscess formation. But even in the

restoration of vital teeth whose pulp is still intact the jacket crown occupies an important position, as appears from our report of practical cases.

PROCEDURE OF MAKING AN ALL-PORCE-LAIN JACKET CROWN.

In the following we shall describe the procedure of making an all-porcelain jacket crown, which lies within the possibility of every conscientious and skilled practitioner. After deciding upon an all-porcelain jacket crown, instead of resorting to a pin crown, which involves the danger of splitting the root, to a banded crown, which is more or less visible and hardly hygienic owing to the deposit of food particles around it and all its disastrous sequelæ, to an unsightly gold filling, or to a frail cement filling that afford no positive guarantee against non-recurrence of caries, the surroundings of the tooth to be restored and any anatomical peculiarities which it might be desirable to reproduce are noted, and the flare of the tooth is taken by means of the wire measurement.

PREPARATION OF THE TOOTH.

The tooth is ground with a fine grit $\frac{3}{4}$ inch carborundum stone up to the gum on all sides. If the tooth is still vital, and the pulp is to be preserved, it is protected against thermal shock from the grinding by freely applying cool water and by grinding very cautiously, as in preparing a tooth for a gold crown. A small knife-edge stone facilitates the grinding operation. Gradually the enamel that has remained is removed up to the gingival line, and the tooth is given a peg-shape. All decalcified dentin is carefully removed, and if the tooth is non-vital, or has an infected pulp, suitable root-canal treatment by any one of the accepted methods is installed, and the canals are filled.

After the tooth has been ground to the peg-shape, a clearly defined, terrace-shaped base, of the breadth of the cutting edge of a knife-edge stone, running

all around the peg-shaped tooth closely to the gingival line, is prepared with an end-cutting fissure bur of fine cut.

MAKING THE MATRIX.

After the preparation of the tooth is finished, the wire measurement is slipped over a tapering handle, and a platinum ribbon, $\frac{1}{1000}$ of an inch thick and of a breadth sufficient to conveniently cover the peg-shaped tooth, is pinched together not too tightly with a pair of pliers at the line indicated on the handle by the wire measurement. The band is slipped off the handle, and a minute pellet of pure gold is dropped into the center of the ribbon which is to serve as a matrix later on. The ribbon is held over a Bunsen burner, and its ends are soldered together. Then this matrix is trimmed, festooned, and slipped over the peg-shaped tooth. By careful burnishing the matrix is gently forced over the shoulder of the peg under the gum, which with some experience can be accomplished without inflicting much pain to the patient. A very fine wire ligature is then carried over the matrix so as to hold it under the gum below the shoulder. Dental floss silk is wrapped in loops around the matrix and wound tightly around the peg and matrix, the end of the silk to be twisted over the end of the matrix on the peg, which insures perfect adaptation of the matrix to the peg. The matrix is also burnished against the shoulder of the peg with flat No. 53 or 54 burnishers. After the silk ligature has been removed, the burnishing process is finished with flat instruments.

MAKING THE IMPRESSION AND MODEL.

The wire ligature is taken off from the neck of the tooth, and the matrix removed in a plaster impression. This impression is varnished and invested in a suitable inlay investment, to which enough plaster is added to cause it to set in a reasonably short time. When the model is separated from the impression, the matrix will be on the plaster

model, and the teeth on either side of the tooth covered with the matrix will be reproduced on the model.

BUILDING UP THE PORCELAIN CROWN.

To allow for the shrinkage of the porcelain during the fusing process, the plaster teeth on either side of the tooth to be restored are cut away—not before their shape and relative position to the tooth to be reproduced, contact point, etc., have been carefully noted. The tooth to be restored is built up one-sixth larger than it is to appear in the mouth. In this building up the dentist must exercise the highest skill, and prove his intimate familiarity with the anatomic structure of the tooth. A slightly wet piece of Japanese paper is laid around the tooth on the model, in order to prevent the porcelain from coming into contact with the plaster.

METHOD OF MIXING THE PORCELAIN.

Porcelain of a light yellow shade is mixed on a clean porcelain slab to a thin, creamy consistence, and with a fine and soft hair paint-brush that has been wetted it is dressed on the matrix layer by layer. The porcelain is shaped with a wet brush, any excessive moisture being absorbed with a piece of blotting paper applied with the finger, and molded and finished with the finger until the desired size and shape of the natural tooth is obtained.

SELECTING THE COLOR SHADE.

The additional one-sixth, which is to be built up to allow for the shrinkage in the furnace, is made up of the coloring layer. The shade of the tooth is selected in the patient's mouth by aid of the shade guide, and matched with the high-fusing porcelain which is sold in shades from A to Z (25 shades), slightly deeper than it is to appear in the mouth after fusing. With this coloring stratum, which is also mixed to a thin, creamy consistence, the tooth is finally contoured, then cut off the model, after which such

finishing touches as one may deem necessary are put on.

BAKING THE CROWN.

The heat in the electric furnace, which must be furnished with a pyrometer, is raised to from 1800° to 1900° F., and the tooth is dried for five minutes at the mouth of the furnace. Then it is gradually introduced into the furnace on a fire-clay slab which has been sprinkled with coarse silex, and the door of the furnace is closed. Within eight minutes the heat in the furnace is gradually raised to 2200° F. When this temperature is reached, the lever of the furnace is gradually turned down to 0, this gradual reduction of the lever to consume about two minutes; then the door of the furnace is opened, and after the heat has abated to about 1800° F. and the shrinkage has taken place, the slab and tooth are removed from the furnace and allowed to cool for examination.

If any defects, checks, or uneven shrinkage are noticed, they are filled in with additional coloring porcelain, and slab and tooth are put back into the furnace, and the porcelain crown is baked once more for ten minutes, within which time the temperature of the furnace is gradually raised to 2300° F., care being taken not to exceed the fusing-point, which is at 2300° F. When 2300° F. are reached, the lever is at once turned down to 0, and the heat is allowed to drop to 2100° F., when the door of the furnace is opened slightly. The tooth is left in the half-closed furnace for five more minutes, and allowed to finish to a glaze.

The tooth is then removed from the furnace and covered with a tin can, in order to protect it against draft. After it has perfectly cooled off, the plaster core, which will come out easily, is removed, and the platinum matrix is carefully pulled out from the crown with a pair of K pliers, which operation is not difficult, as the ends of the matrix protrude over the cervical edges of the crown. If these directions have been properly followed, the strength, color, and

cast of the crown are perfect, and the crown is ready for setting. porcelain jacket crown offers the following advantages:

FIG. 1.



SETTING THE CROWN.

For setting this crown, Harvard inlay cement thinly mixed is used. If the crown is of a slightly darker shade than desired, a lighter cement is used for setting, and

(1) The natural anatomic relationship of the tooth in the mouth is fully preserved.

(2) There is no danger of the crown being revolved, as so often happens with pin crowns.

FIG. 2.



vice versa, if the shade of the crown has turned out a trifle too light, a darker cement will correct the shade.

ADVANTAGES OF THE ALL-PORCELAIN JACKET CROWN.

Apart from affording an ideally beautiful and natural restoration, the all-

(3) There is no danger of the root being split, as in pin crowns.

(4) There is no irritation of the gingivæ or the pericementum, and no accumulation of foodstuff, as in banded crowns.

(5) The stress of mastication is not directed against a single pin, as in pin crowns, but is borne by the natural root

reinforced by a suitable root-canal filling, the peg of the tooth left, the cement, and the porcelain jacket.

be shattered by violent trauma, there is still a possibility left for the last resort of a pin crown.

FIG. 3.



(6) Breaking of the all-porcelain jacket crown, if the latter be set correctly, has not been observed so far. Even if such an accident from severe trauma

PRACTICAL CASES.

Miss J. F. A large cavity in the lower left second bicuspid had been filled with amalgam, the pulp remaining vital. A jacket

FIG. 4.



should occur, the crown can be replaced by another of the same description, as the peg and root of the tooth are likely to remain intact.

(7) There is no recurrence of caries, as there is practically no cement line, and the gingivæ after a short time cover the shoulder, *i.e.* the line of juncture between the non-irritating porcelain and the natural tooth-structure.

(8) Even if the crown and peg should

crown was put on five years ago, which is still in the mouth (Fig. 1). Although the tooth remained vital, no thermal shock has ever been felt. A part of the original amalgam filling was left in the peg-shaped tooth in preparing it for the jacket crown. No joint is perceivable, and the articulation is perfect. The shade of the crown is slightly too light, which in a tooth in that position is of no great importance. The tooth is being strenuously used in mastication.

Miss M. M. J. The lingual portion of the

upper left first bicuspid was broken off, the bite being too close. The tooth had been filled with cement after the root-canal had been treated. A porcelain jacket crown was put on one year ago. (Fig 2.) The articulation is good, also the joint. The match in color is not quite perfect. The tooth affords perfect comfort and use.

Mr. W. W. Th. The enamel of the lower left first bicuspid, which was vital, had been attacked by caries, which blackened the tooth. The tooth was prepared three years and five months ago, remaining vital, and a jacket crown was put on. (Fig. 3.) No thermal shock has ever been felt; there is no sensitiveness on percussion. The articulation, the joint, and the shade are so perfect that the

ing the tooth the appearance of a natural one. The two upper centrals, being small and separated by a very wide interstice, were also fitted with labial facings built up and baked like the before-mentioned one, reducing the interstice and overlapping the lower centrals. The upper right lateral, which re-truded buccally, was in the same manner fitted with a porcelain facing, and thus brought into line with the other teeth. The upper right canine was ground down to peg-shape and fitted with a jacket crown, to which a porcelain tooth was baked on either side, thus doing away with the rubber denture. These teeth ride on the gum, and have caused no irritation either of the gingivæ or of the still vital abutment tooth.

FIG. 5.



tooth cannot be distinguished from a natural one even by the eye of some professedly skilled dentists.

Mr. H. H. Six years ago this patient presented a case of pronounced lower prognathism. He wore a partial rubber denture, supplying the upper left bicuspid, and the upper right lateral and bicuspid. Without any regulating appliance the bite was raised by crowning the two lower right bicuspids and the upper left bicuspid with porcelain jacket crowns. (Fig. 4.) The pulps in all these teeth are still vital, and have shown no untoward symptoms or thermal shock. The lower right canine, which labially protruded considerably, was ground down labially, and a thin porcelain facing, which was built up on a matrix and baked, for this special case, in a manner similar to the jacket crown, was fitted directly into a groove on the labial surface of the still vital tooth. The joint is still perfect, and no caries at this line is noticed. The shade is perfectly matched, giv-

The upper left bicuspid has not been replaced, it being the intention to first test the porcelain teeth baked on to the jacket crown as to its durability as an abutment, and the effects of the two porcelain teeth upon the abutment and the gingivæ. The principles practiced in this case will not meet with the approval of the conscientious dentist. The patient, however, wished to test the efficiency of the porcelain jacket-crown method, and was willing to take the risk. At any rate, his mouth, which formerly presented unsightly irregularities, is now very much improved (Fig. 4) and is presentable, and at first sight would not lead one to suspect the presence of artificial crowns and teeth. No caries at any of the joints, no splitting or cracking of the porcelain, nor any other untoward symptom, has been observed in five and one-half years.

Mr. R. H. R. Two approximal cavities in the upper left canine had been filled with cement. The cement fillings having been re-

peatedly washed out and replaced, caries recurring and the pulp being infected, root-canal treatment became necessary. After removing all carious dentin, the tooth was found to be too frail to support a gold filling. The tooth was therefore filled with amalgam, and then prepared to receive a jacket crown, by being ground to peg-shape.

The jacket crown (Fig. 5) is of very good shade, the joint being imperceivable even to the tongue. Besides improving considerably the appearance of the patient's mouth, the solidity of the crown is so great that incision on the left side—which had been performed entirely on the right side, owing to the frailty of the cement-filled canine—has been resumed.

ORAL SURGERY: SOME PRELIMINARY REMARKS.

By HENRY GLOVER LANGWORTHY, M.D., Dubuque, Iowa.

ORAL surgery may be defined as the practice of surgery about the mouth.

Sterilization of tooth-roots, the application of an orthodontic apparatus, repairing decayed teeth, incising abscesses, etc., as so many writers have pointed out, are therefore surgical, though minor surgical operations. In this paper the term oral surgery will be taken to mean any operation necessary to cover disease occurring in the region of the upper or lower jaws.

That the successful treatment of diseases and deformities of the maxillary bones and adjacent structures requires special training covering many important phases of dentistry and rhinology as well as surgery itself, is without cavil. Within a comparatively recent date, however, few physicians had the necessary training and opportunity to cover such an exacting subject satisfactorily, even though they possessed the skill. Fortunately these conditions are no longer true, as there are now many workers along the highway of oral surgery, all striving earnestly to bring order out of chaos, borrowing from other departments whenever necessary, and slowly but surely developing the field. That the average medical practitioner has sometimes failed to realize how necessary it is to save the teeth and jaw in all operations about the mouth must be reluctantly admitted. Many daring surgeons, indeed, had little respect for teeth, jaw, or even external

deformity. If an external operative route offered an easier approach to a diseased part, the busy surgeon was very likely to make that route the operation of choice. Time, special instruments, and close study nowhere bring their reward so quickly as in dealing with pathological conditions of the nose, mouth, and jaws. The oral surgeon of today certainly must be ready to go to extremes in time and money rather than leave an unsightly and mortifying scar about the face. It is unnecessary, however, to continue such familiar observations.

Although pathological processes involving the jaws are comparatively few in number, the variations in clinical types seem almost endless and may prove confusing. Every case in reality becomes a law unto itself. The following affections represent most of the conditions confronting the oral surgeon:

(1) Removal of necrosed bone from the upper and lower jaws.

(2) Treatment of fractures of the lower jaw and wounds in general about the mouth.

(3) Repair of hare-lip and cleft palate.

(4) Incision and curetment of jaw cysts.

(5) Excision of tumors such as fibroma, sarcoma, endothelioma, and angio- and osteosarcomas.

(6) Removal of adenoids and tonsils preceding oral prophylaxis, widening of

the palate, or any necessary orthodontic work.

(7) Correction of nasal obstructions from whatever cause.

(8) Treatment of disease of the maxillary sinus (empyema of the antrum of Highmore).

(9) Treatment of defective jaw closure or cicatricial contractions due to burns.

(10) Supervision and management of trifacial neuralgia from both the medical and surgical standpoints.

(11) Removal of moles and nevi about the lips or cheeks.

(12) Treatment of accidents—such as, for instance, collapse following either a local or a general anesthetic.

I am well aware that many of the subjects included above may encounter some objection on the part of both the dental and the medical profession. There are probably few men today who could cover the entire field well without many years of special study and training. The field, formidable as it is, however, is not beyond the reach of the average oral surgeon. Although the proper treatment, for instance, of any and every nasal obstruction as contrasted with the complex task of management of trifacial neuralgia would seem at first glance to be at opposite ends in a consideration of affections of the head, they ought nevertheless to be included. To the author, at least, it would seem clear that the conscientious oral surgeon will try to make himself proficient in all.

(1) *Removal of necrosed bone from the upper and lower jaws.* (Acute and chronic osteomyelitis.) This is one of the very important features of oral surgery. Necrosis of the jaws responds rather readily to proper surgical treatment, which means removal. If the necrosis be extensive a general anesthetic had better be employed. Almost all the cases seen in dental clinics are the result of tooth-abscess. Frequent consultation between dentist and physician is important.

(a) *Acute osteomyelitis:* Acute suppurative inflammation of bone is commonly spoken of as acute osteomyelitis. It is an intense inflammation occurring

especially in young adults, and is due to pyogenic organisms arising as a rule from infection about a tooth-socket. The acute suppuration results in the death of a portion or layer of the bone, hence the term "acute necrosis" is sometimes employed. Single or multiple fistulæ quickly form. As long as any portion of dead bone remains, the suppuration refuses to heal and a discharging sinus continues. The symptoms of acute osteomyelitis are pain, redness, and swelling of the alveolar process and cheek, loosening of the teeth in the alveoli, marked constitutional disturbances such as fever, prostration, and finally discharge of pus.

The history of a typical case is somewhat as follows: An incisor or an upper molar filled, but later followed by soreness about the tooth or gum. Often the history of an old abscess following dental work may be obtained. In spite of the region being lanced repeatedly, the swelling continues along the jaw line, and involves the cheek. Many of the teeth become loose in their sockets, and a discharge of pus is noticed from several openings. The patient, perhaps seriously ill, is confined to bed and requires daily visits by both dentist and physician. Gradually, as the acute stage passes, the teeth tighten, fistulæ close with the exception of one or two, and resolution finally takes place without any large sequestra forming. Often, if the disease is extensive, the necrosis involves the bony palate and the antral walls. If the case be even more severe, however, fetid discharge continues in spite of drainage, and necrosis takes place in new areas. Several teeth are perhaps extracted, together with large pieces of bone. If this does not effect a cure a general anesthetic is finally administered, all sequestra are removed, necrotic bone is thoroughly curetted, and recovery is then prompt.

A still more severe type of osteomyelitis is frequently seen in connection with the lower molars, with a history about as follows: Cause unknown, but attributed to caries in a lower molar which has been badly neglected. Examination

discloses a profuse offensive discharge containing bone fragments from a large sloughing area somewhere on the outer alveolar border. Perforation of the external tissues near the angle of the jaw may have already taken place; constitutional symptoms are marked. The extension of necrosis is so rapid that within a short time the entire jaw bone over the area affected is practically destroyed or at least separated from the rest of the mandible. Any treatment falling short of complete removal of the diseased portion of the jaw in a case of this kind is apt to prove unsatisfactory.

(b) Chronic osteomyelitis: The history of most cases of chronic osteomyelitis is as follows: History of trouble about a tooth continued perhaps for years. After a variable time a discharging sinus formed which refused to heal in spite of burring or light scraping. Often these fistulous tracts extend laterally toward the antrum or backward into the bony palate. They may apparently close for a time, only to reopen and discharge from year to year. The correct treatment in such cases is as follows: In long-standing chronic cases with fistulous tracts, the only rational treatment is a surgical one, which means the thorough removal of the carious bone wherever found. Any abscess or fistulous tract on the alveolar border which refuses to heal should be opened and curetted. The teeth need not be sacrificed. Under no condition should a dentist attempt to treat disease which has passed beyond the tooth by drainage through the root-canals.

(2) *Treatment of fractures of the lower jaw and of wounds in general about the mouth.* Fracture of the mandible is a familiar subject to dentists. The body of the bone is usually involved, as for instance near a canine tooth. As almost all of the severe fractures require some form of interdental splint, the services of a good mechanical dentist cannot be dispensed with. The surgeon and the dentist should handle these cases together to secure the quickest and best results.

In regard to wounds about the mouth,

it may be said that their treatment differs little from that of surgical wounds elsewhere. Most wounds about the mouth must be regarded as infected, and therefore thorough cleansing of the wound before treatment is essential. All ragged edges should be trimmed, carefully approximated, and the wound closed by sutures whenever necessary. Prevention of possible deformity is always to be considered if the lips are directly involved.

(3) *Cleft palate and hare-lip.* Under ordinary conditions cleft palate should be operated upon as soon as possible after birth. Closure of the cleft later in life does not remedy defective speech, while on the other hand, if the operation is performed early during the period of growth, speech is improved most decidedly, and the cosmetic results are sometimes astonishing. As a rule, cleft palate and hare-lip are both operated upon at the same time. Second and even third smaller operations are often required before permanent closure is secured and the best result obtained. In these cases especially, a well-equipped and experienced oral surgeon should be preferred over most operators.

(4) *Incision and curetment of jaw cysts.* Cysts of the maxillary bones practically always occur in the lower jaw either in connection with the teeth or, though more rarely, originate in the cancellated tissue of the bone. Two forms of cysts are commonly encountered, the first in connection with the completely developed tooth, of ordinary inflammatory origin, usually at the apex, and the second occurring while the tooth is still in process of development and has not yet erupted. The latter is known as the dentigerous cyst.

Cysts are of slow growth and are usually painless. On careful examination they should be differentiated from other tumors. If doubt exists, exploration with a small needle or trocar may easily be made. Cysts of the lower jaw are treated by incision from within the mouth, removal of the contents with a sharp curet, and whatever toilet of the operative wound seems necessary.

The dentigerous cyst, which is a com-

mon form of odontoma, arises from an unerupted tooth. It begins as a swelling of the jaw below the alveolus on the outer surface. Occurring as it does in the substance of the bone, it usually contains some portion of the tooth from which it has arisen. This tooth is also found missing in the dental arch.

(5) *Excision of tumors such as fibroma, endothelioma, and sarcoma.* The jaws are frequently the seat of tumors of both benign and malignant character.

Fibroma: Fibrous tumors may develop from almost any portion of the jaw. They are of slow growth, firm, usually painless, show no tendency to ulcerate, and do not infiltrate the surrounding tissue. A fibroma should be freely exposed by dissection and removed through the mouth. For recurring fibromata an operation of considerable extent is sometimes necessary.

Enchondroma: Enchondroma is frequently a mixed tumor, and should be extirpated.

Osseous tumors: Bone tumors or exostoses may also develop in connection with the jaws. They occur in middle-aged people and are produced by external irritation or trauma. They may attain considerable size. The diagnosis is made by noting the excessive hardness of the tumor and its benign character. As a rule they should be removed.

Sarcoma: Of the many varieties of tumors which affect the jaws, sarcoma is one of the most frequent, and it occurs in all periods of life. It may appear in any portion of the bone. When springing from the alveolar border these tumors are familiarly known as sarcomatous epulids. These growths are malignant in character and unless thoroughly eradicated will recur. A surgeon should under no circumstances undertake operative procedure unless he is prepared to perform the most extensive operation if it be found necessary. Often no operation short of extirpation of the entire lower jaw or of one-half of the upper jaw should be performed.

Epithelioma: This is about the only form of cancer encountered. It takes its origin from glands somewhere in the

mucous membrane. This growth is intensely malignant. Ulcerations appear early, often with copious foul discharge. Treatment consists in early and complete removal if possible. Neighboring lymphatic glands are involved.

(6) *Removal of adenoids preceding oral prophylaxis, widening the palate, or other orthodontia work.* As nasal obstruction tends to produce deformities of the jaws, irregularities of the teeth, and under-development of both the nose and the jaws, it is often important that such conditions be remedied before a contracted arch is subjected to dental expansion. In other words, as nearly normal breathing as possible should be established prior to treatment for malocclusion, if we are to obtain the very best results. Mouth-breathing also tends to produce altered conditions about the gums and irregularities of the teeth. Widening of the palatal arch in many instances results in an increase in the size of the cavity of the nose as well as in a stimulation of normal development. This has been well shown by G. V. I. Brown, Dean, Black, Bogue, and others.

(7) *Correction of nasal obstructions.* Conditions producing nasal obstruction are numerous, and may be found in the nose, naso-pharynx, or oral pharynx. At the present time this work is rarely undertaken by any but nose-and-throat specialists. It is important, however, that the dentist should have some idea of the more common pathological processes within the nose and their treatment.

(8) *Treatment of diseases of the maxillary sinus.* Cases of antrum involvement may roughly be divided into two distinct groups: First, a group where the chief features are the nasal features; second, a group where the prominent features are oral and dental. In the simple acute form of suppuration of the maxillary sinus where there are few granulations and no carious bone, lavage of the infected antrum with warm antiseptic solutions is often followed by a cure. Irrigation of the maxillary sinus, however, cannot be effected through the normal opening, hence a trocar with cannula attachment must be introduced beneath

the inferior turbinate bone a little above the floor and about an inch back, and forced directly outward into the sinus. After penetrating the antral wall by this means, the trocar is left *in situ*, and copious irrigations are made through the tube. This procedure is especially practical in making a positive diagnosis. The best method for surgical treatment of the sinus, and the one employed in the writer's routine, is to remove the anterior half of the inferior turbinate body in the nose with scissors or saw, puncture the outer wall of the nasal cavity near the floor, and then make as large an opening into the antrum as desired. The antrum by this common method can be thoroughly explored and treated. If a tooth has already been extracted, or if by reason of a carious fistula the tooth cannot be saved, it is extracted, and a large opening is made with a chisel and curet upward into the antrum. The alveolar opening must be large enough to admit the little finger. Not only does the author insist on a large opening here, but a second counter-opening is also made through the naso-antral wall as previously outlined. Drainage through a tooth-socket is not desirable under ordinary circumstances.

Canine fossa operation: The preliminary stage of this operation, which so many cases require, consists in elevation of the upper lip and dissection of the tissues at the labio-gingival margin. The tissues are dissected free over the canine fossa, and practically the anterior bony wall of the antrum is removed. A second opening is then made out into the nose. On completion of the nasal opening the mucous membrane and tissues over the canine fossa are closed by sutures. All subsequent treatments are made through the nasal opening.

(9) *Treatment of defective jaw closure or cicatricial contractions due to burns.* Jaw closure occurs either as a temporary or permanent condition. The temporary or so-called spasmodic form is a result of some condition affecting the motor filaments of the third branch of the fifth nerve causing a spasmodic contraction of the elevator muscles. The

condition is due to such causes as delayed or difficult eruption of the three lower posterior teeth, abscess or necrosis about the teeth, tumors and even acute inflammation in and about the tonsils. Treatment includes discovery and removal of the cause. Permanent jaw closure may be due to ankylosis of the temporo-maxillary articulation or even to union of the alveolar borders themselves through the formation of cicatricial or inflammatory bands. The treatment of jaw closure is often the despair of the surgeon. Cicatricial bands should be divided and care should be taken to prevent the reunion of the cut surface, or the entire cicatricial mass may be excised. As a rule all operative procedures should be done through the mouth. Jaw closure due to bony ankylosis can only be relieved by resection of part of the bone, such as, for instance, the removal of one of the condyles.

(10) *Supervision and management of trifacial neuralgia from both medical and surgical standpoints.* As has been mentioned elsewhere, many will no doubt be inclined to disagree with the writer in including such a subject under oral surgery. As the dentist sees many of these cases, however, he must of necessity be able to make a clear diagnosis, which gives him at least the opportunity of following the cases with the physician throughout varied lines of treatment. By consulting the standard text-books of medicine and surgery, and by adhering to certain fundamental principles, the dentist will become a better-trained observer in a comparatively short time. These cases vary greatly in intensity, and even their pathology is obscure. External applications for allaying the pain, such as heat, cold, cupping, liniments, electricity, etc., have all been employed at times with considerable success. In very severe cases which refuse utterly to yield to medical treatment, deep injections of osmic acid or alcohol directly into the nerves at their exit from their foramen at the base of the skull should be employed. Of the various operations for the relief of an otherwise hopeless condition we have division and resection

of nerves, and plugging of the superficial foramina of the face with metal plugs. Finally, when all other measures have failed and the patient refuses to tolerate the condition any longer and pleads for some relief, we still have the decidedly dangerous operation of intra-cranial resection of the Gasserian ganglion.

(11) *Removal of moles and nevi about the lips or cheeks.* The dentist, as well as the nose-and-throat specialist, is often consulted in regard to facial blemishes, for the principal reason that these patients do not know where else to go. A congenital pigmented hairy mole is disfiguring, and is always thought by the possessor to be more conspicuous than it really is. The removal of birth-marks by the application of powerful freezing agents, caustics, electricity, etc., requires experience and caution. Nevi if moderately small may be excised; hemorrhage, however, is almost always considerable. Carbon dioxid snow is at present being extensively tried at the various dermatological clinics as the best agent for removing moles.

(12) *Treatment of accidents following the use of either a local or general anesthetic.* Cocain is of course the usual local agent employed, as it will anesthetize mucous membranes if merely applied to the surface, and in the majority of cases is productive of little harm. To affect the skin and deeper structures, however, the drug must be injected in

weak solutions, and in many cases it promptly produces slight toxic symptoms. Occasionally mild sloughing of tissue follows its use, and even sudden death. Naturally the drug should be used cautiously; it requires experience, and its use in unskilled hands has resulted in a dread of cocain which really should not exist. There is hardly any nose-and-throat operation performed by the specialist, for instance, in which he does not get occasional toxic symptoms, and thinks little of it.

The administration of a general anesthetic is a surgical procedure and should be carefully studied. Aside from accidents due to vomiting or choking, sudden collapse may take place which calls for most prompt and energetic measures for relief. The investigation of anesthesia is always of prime importance to the oral surgeon, and surgery in general owes many of its present advances directly to the dentist.

CONCLUSION.

In conclusion it may be stated that too much stress cannot be laid on the surgical anatomy of the mouth and face, as a great variety of unexpected operations are encountered in this region. It is very necessary, also, for our own individual training, that all tissue from pathological lesions be hardened, stained, and mounted for microscopical study.

A METHOD OF MAKING GOLD FILLINGS WITHOUT THE USE OF PITS, PARALLEL GROOVES, OR UNDERCUTS FOR RETENTION.

By Dr. W. R. CLACK, Clear Lake, Ia.

(Read before the Pennsylvania State Dental Society, at its annual meeting, Pittsburg, June 29, 1909.)

THAT it is the intention of every honest dentist to use such methods and materials as will best protect the teeth of his patients, and thus contribute to their comfort and health, no one will deny. No honest dentist would wish to make an inferior operation if he knew a better method, but the question arises here, Which is the better or best method? Would it not seem that a system of seating and retaining large fillings with the least loss of dentin should be one of the better methods? Without attempting to disparage any other method, I will present to you a system of cavity preparation and instrumentation for cavities in the proximo-occlusal* surfaces of molars and bicuspsids that is followed very closely by the disciples of Dr. G. V. Black and Dr. E. K. Wedelstaedt.

First of all, sufficient separation must be secured so that the teeth may be restored to their original mesio-distal diameter, and such contact points be made as will preserve the interproximal space and protect the gum therein. There are many ways of gaining this separation, some humane and some otherwise. The placing of soft rubber strips between the teeth is effective and may sometimes be necessary, but such means should be used only when other methods fail. Waxed tape or cotton is ordinarily painless, and if renewed often enough may not become

very offensive. Mechanical separators may sometimes be so carefully used as to produce good results without inflicting much pain, but if you wish a peaceful rest in the hereafter, don't jam an excavator or other instrument into the interproximal space, and then have your assistant put her weight on it!

When there is occlusion, the teeth may be painlessly separated by removing the decay or old fillings and packing sheet gutta-percha into the cavity. If one or two tiny "red cross" pledgets of cotton be laid on the gum at the gingival margin and removed after the gutta-percha is in place, the gum septum will be protected from undue pressure. If this is carefully done the teeth are protected from caries, thermal shock, and the impaction of food, and are in better condition for operation than when violence has been done to the gum tissue and periodontal membrane by immediate separation.

The dam is now adjusted, and the teeth that are exposed are sterilized and dried. Then with chisel and mallet all overhanging enamel is broken down and the cavity form is outlined. Then begin the preparation of the seat. If decay or subsequent preparation has carried the cavity far enough gingivally for the free margin of the gum to cover the gingival margin of the finished filling, you may square up the gingival seat. If not, take a small inverted cone bur in the engine, and by inclining it first lingually and buccally pass it back and forth in the dentin just inside the dento-enamel junction, until

*[In this paper the word *proximal*, as employed by Dr. G. V. Black and his followers, is used instead of *approximal* according to the COSMOS standard.—Ed.]

you have reached the desired depth. If this has been properly done, you have only to cut away the enamel, and your cavity seat is ready to be squared up. This seat must be *at right angles to the line of stress*; this is usually in line with the long axis of the tooth, but if conditions are such that you cannot have both, the line of stress is the all-important one.

A teacher in one of our western colleges says that he inclines this seat toward the axial wall so that the stress of occlusion will cause the filling to slide toward that wall. To this I object—First, because in proportion as you cut away the dentin in that part of the gingival seat, you weaken the tooth at that place, and

requires increased retention form, and then is nearly always unsatisfactory.

In preparing these walls some operators flare them from the axial wall to the enamel margin and from the gingival seat to the occlusal surface, and then for retention make undercuts in the linguo- and bucco-gingivo-axial angles. (Fig. 2.) I object to this for the following reasons: There is no retention except the undercuts, and I cannot perfectly fill undercuts; also, whenever you flare a wall gingivo-occlusally you throw lateral stress on the lingual and buccal walls, making them likely to be split off, and the slant of the axial wall may force the filling out of the cavity. (Fig. 3, A.)

FIG. 1.

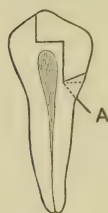


FIG. 2.

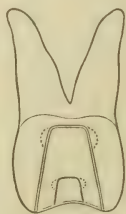


FIG. 3.



FIG. 4.



what you see in Fig. 1, A, is likely to take place. Secondly, I object to the movement of a filling toward the axial or in any other direction, for it invariably spells failure.

Having prepared the gingival seat thus far, make the lingual and buccal walls parallel to each other and at right angles to the gingival seat and the axial wall. It is in this very respect that so many fail in regard to resistance form, and consequently fail altogether, for retention is largely a matter of proper resistance form. Successful feeders say that an animal well summered is half wintered, and that an animal poorly summered starts into the winter so handicapped that it will eat more grain, develop less growth, and come out in the spring in a condition inferior to the one that was better summered. In the same way, I fully believe, a filling improperly seated by reason of faulty resistance form

Others, thinking to make assurance doubly sure, go to the other extreme, and, starting with a narrow cavity in the occlusal surface, flare or widen it all the way to the gingival wall (see Fig. 4). Such a preparation, in my opinion, would greatly weaken the lingual and buccal walls, and unless a specific gravity of 19 + were obtained, the filling would under heavy stress be moved gingivally, and the least movement in that direction would cause a leak all along the lingual and buccal margins, because those walls give no support to the filling, whereas parallel walls at right angles to the seat, as illustrated by the dotted lines, would give support to the filling. The angles made by the union of the lingual and buccal walls with the gingival wall, and the point angles made by the union of these walls and the axial wall, must be squared out perfectly.

With a square box (see Fig. 5, section

of a bicuspid; A and B show the angles squared), all you need to do is to thoroughly condense the gold, and you will find the dentin in the lingual and buccal walls sufficiently elastic to give slightly, so that a cross section of the filled tooth (Fig. 6) will show that the filling is wider from A to B than the cavity was before the filling was inserted. I would rather depend on that amount of retention of that kind than adopt the style of preparation illustrated in Fig. 7, which was shown and advocated by a dentist at the thirty-first annual meeting of the Nebraska State Dental Society. This illustration is drawn in exact proportion to the one which that essayist demonstrated. He believes in

pulp or to avoid a weakening of the tooth by removing too much dentin. In such a case we have just the same amount of resistance surface sustaining the same relative position to the line of stress. But the same amount of care must be used in squaring out all the angles and point angles.

Someone has probably been thinking that I would cut that cavity wide enough linguo-buccally to make the proximal margins in self-cleansing zones, or that I would take up the much-mooted question of extension for prevention. Neither supposition is correct. Unless forced to do so by extensive caries, I would not cut that cavity much more than one-third of the width of the tooth, but begin just

FIG. 5.

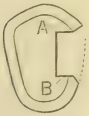


FIG. 6.



FIG. 7.

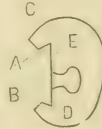
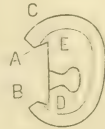


FIG. 8.



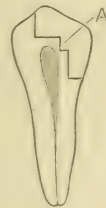
what he calls "retentive grooves or divergent planes." He further says that because the distance from A to B is smaller than that from C to D, a filling can be driven into these points and thoroughly condensed without fear of rocking.

On looking at Fig. 7 this may seem true, because one may think that the filling would be well anchored in the dentin, but Fig. 8, in which the enamel is shown, demonstrates how very little retention in the dentin is really obtained. I am of the opinion that if one should attempt to "thoroughly condense" gold in the angle A C E, a fracture would occur. The operator would have very much less dentin to depend on than in the preparation shown in Figs. 5 and 6. There are cases of extensive caries where the pulp is not exposed, but where the squaring out of the pulpal wall to the depth of the carious area would cause exposure. In such cases we have recourse to steps. (Fig. 9.) You know the rule—"The gingival must be flat or in steps (which is equivalent)." I often make one and sometimes two steps to avoid close approach to the

within the dento-enamel junction to flare the cavity marginward until these margins extend to where the excursions of food will keep them cleansed.

It is not necessary to cut a tooth all to pieces in order to comply with exten-

FIG. 9.



sion for prevention. The G. V. Black Club teaches three kinds of extension: Extension for prevention, which means the placing of the cavity margins in immune areas; extension for convenience, the making of all parts of the cavity accessible; and what Dr. Wedelstaedt terms "precautionary extension," the cutting back of such margins as are sub-

jected to great stress to areas of safety. This applies particularly to occlusal surfaces and incisal angles.

We will now take up the problem of retention. Experience has shown that retention is best obtained by cutting a step in the occlusal surface, including in it all imperfections which may be found in that surface. This must be cut through the enamel. What has been said about squaring out the angles and point angles in the gingival seat applies here. Slightly round the union of the axial and pulpal walls, bevel the cavo-surface angle, remove all chips and dust, and the cavity is ready for filling.

Gold foil No. 4 unannealed has been cut into halves, quarters, eighths, sixteenths, thirty-seconds, and sixty-fourths of a sheet. The halves and quarters are folded into long narrow strips. The strips are then rolled around a jeweler's broach into what we call cylinders. The other fractions are rolled with tweezers and the fingers into loose pellets. These are annealed before being used, but the cylinders are used "soft." Dr. Black has nowhere said that we must all apply exactly the same manipulation, if we but accomplish the same result. Simply because I can obtain a better adaptation of gold to the lingual and buccal margins, I use these cylinders in a manner slightly different from that laid down in Dr. Black's works on operative dentistry.

The disciples of Black and Wedelstaedt use the cylinders of unannealed gold in the gingival third of these cavities, but I am compelled to use them also on the lingual and buccal margins, because I am not sufficiently expert in the manipulation of annealed gold to always secure its perfect adaptation to the margins. I roll the first two cylinders a little more loosely than the others, so that when I flatten them out they will reach from the gingival wall to the occlusal surface. I place one against the lingual and one against the buccal wall, pressing them snugly against those walls. Then, with cylinders more tightly rolled and flattened, I fill the intervening space, mak-

ing the last one wedge-shaped and using it to key the others into place. (Fig. 10.) Then I condense gingivally all but the first two cylinders mentioned (Fig. 11), the line of stress being directed slightly against the axial wall. The gold being unannealed, condensation gingivally will cause it to flow laterally as well, and one will be surprised to see how firmly it will hold the first two pieces against their respective walls. Excepting these two pieces the unannealed gold must not come beyond the step. In fact I prefer it to stop just short of it.

FIG. 10.

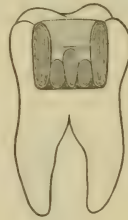


FIG. 11.



Then I begin in the step with annealed gold, using a No. 2 straight Wedelstaedt plugger. (If the tooth is not sensitive to the blows of the mallet, I may use a No. 3 plugger and more force.) As soon as the gold is anchored in the step, I carry it over the pulpo-axial angle and unite it with the unannealed gold about midway linguo-buccally, and then carry it toward the linguo-gingivo-axial and bucco-gingivo-axial angles, keeping it slightly fuller in the center, so that the last piece each time is wedged between this higher place in the center and the wall which I am approaching. I then continue building-in the annealed gold, carrying it farther and farther out over the gingival seat each time, condensing the unannealed gold and at the same time uniting it by interserration with the annealed gold and driving it against the cylinders of unannealed gold lining the lingual and buccal walls. This is continued in the usual manner until the filling is properly contoured and finished.

A CONTRIBUTION TO THE PROPHYLACTIC TREATMENT OF CARIES.

By HANS HECHT, M.D.S., Zahnarzt, Berlin, Germany.

ALTHOUGH Miller's incomparable researches have facilitated our understanding of the origin of caries of the teeth and have laid down the general lines along which the treatment and prophylaxis of caries must proceed, there are still many cases left where the practical application of Miller's chemico-parasitic theory fails to prevent the re-appearance of the carious process.

It is taken for granted that the use of antiseptic washes, of the tooth-brush, and of the toothpick, as well as the regular care of the teeth by a competent dentist, hold good for the cases in question; but these preventives do not suffice. We find patients in whose teeth new defects appear every little while in spite of all possible hygienic precautions. Then again there are patients whose mouths are the very opposite of clean, who do not keep their teeth free from food and other unclean deposits, or who have never even used tooth-powder or antiseptic mouth-washes, yet their teeth are quite perfect and free from the slightest carious defect.

We might accept Angle's and Black's opinion that the regular arrangement of the teeth in the dental arch preserves them from decay, did we not find persons, even advanced in years, with the whole row of upper or lower teeth sound, even when the articulation is poor and the teeth are irregular. Again, occasionally we meet with a sudden cessation of caries in patients accustomed to having fresh carious defects appear in their teeth in spite of scrupulous care and proper dental attention. The patient himself may not have made the slightest change in the care of his teeth; he may even, as not infrequently happens, have become

discouraged and have begun to neglect them. A similar change—this time for the worse—may be observed in patients whose teeth, though entirely neglected, do not show any signs of decay for years, when all of a sudden they become carious.

These facts, which apparently contradict existing theories as to the origin of caries of the teeth, were first explained by Dr. Michaels* of Paris. He based his investigations on the idea that all the organs of an animate being are in a state of biochemical interdependence. If any one of these organs becomes diseased, the first effect will be to produce infinitesimal changes in all the other organs; it will, further, have a biochemical effect on their secretions and excretions. He made scrupulously accurate examinations with the microscope, micropolariscope, colorimeter, spectroscope, and certain chemical reagents, and was able to prove that all diseases which produce a change in the metabolism affect the saliva as well. In the course of this change certain pathological elements, especially those of the bile, enter the saliva, while other normal elements disappear from it. He showed that even the latent stages of all dyscrasic diseases could be as accurately diagnosed from the biochemical state of the saliva as from that of the urine. The results of these researches he recorded on charts, and the accuracy of these charts was tested on patients in the Paris hospitals.

Dr. Michaels distinguishes three kinds of saliva—(a) the saliva of a healthy person, (b) the saliva of a person affected

* Transactions of the Third International Dental Congress, Paris 1902, "Essai de Sialo-sémiologie," par M. Michaels, de Paris.

with a hypo-acid diathesis, and (c) the saliva of a person affected with a hyper-acid diathesis. Hypo-acidity and lymphatism are the terms which he applies to a diseased state in which the biochemical processes are accelerated, the oxidations and "hydrations" being above normal whereas the acidity is below normal and the secretion of chlorids is increased. Hyperacidity he applies to a diseased state where the biochemical changes are retarded, the oxidations are imperfect, products of the incomplete combustion remain in the system, and the acidity of the organs is increased. The blood, urine, and saliva are acid. Dr. Michaels found hypo-acidity, for instance, in scrofula and tuberculosis. With diseases of the hyperacid type he classifies liver affections, gout, rheumatism, sclerosis, diabetes, and a few forms of albuminuria. The saliva of persons affected with hypo-acidity contains more than the normal amount of glycogen, albumin, mucin, organic chlorin bases, and ammonia. It contains, on the other hand, less than the normal amount of alkaline sulfocyanates and acid salts of the bile. The alkalizing power which this saliva possesses makes it a good soil for the development of bacteria and consequently for the promotion of caries. The saliva of persons affected with hyperacidity Dr. Michaels found to contain more than the normal quantity of alkaline sulfocyanates, acid organic and inorganic salts, acid calcium phosphates, acid sodium phosphates, oxalates, urobilin, and other bile pigments.

Dr. Michaels found furthermore that the occurrence of caries depends very largely on the proportion of ammonia to sulfocyanic acid contained in the saliva. Persons affected with hypo-acidity were found always to have proportionately more ammonia than sulfocyanic acid in their saliva. In cases where the ammonia largely predominated Dr. Michaels always found rapid decay of the teeth. Where there was an average predominance of ammonia over sulfocyanic acid he found caries to a moderate extent. When ammonia only slightly predominated caries was either absent alto-

gether or had only just begun to show itself. Persons who were affected with hyperacidity always proved to have more sulfocyanic acid than ammonia in their saliva. They showed no signs whatever of caries. The saliva of healthy persons he found to contain equal parts of sulfocyanic acid and ammonia. Here, too, there was a complete absence of caries. The teeth were protected from carious decay by the presence of alkaline sulfocyanates in the saliva.

Dr. Low and Dr. Beach, who were appointed by the New York State Dental Society to investigate this subject, came to similar results. They examined some 300 patients to see if they had potassium sulfocyanate in their saliva. They found that patients with sound teeth invariably had potassium sulfocyanate in generous amounts. The saliva of persons with poor or carious teeth showed either no traces of potassium sulfocyanate at all or very slight quantities. If, however, these patients were given tablets with half a grain of potassium sulfocyanate, in fifteen to thirty minutes' time signs of potassium sulfocyanate appeared in the saliva; after these tablets had been taken daily for a fortnight or so there was every evidence that the progress of caries was gradually abating. If after some little time had elapsed the saliva contained an insufficient amount of potassium sulfocyanate the tablets were again prescribed. Dr. Beach tested this phenomenon for three years, examining during that time nearly 300 patients.

The results of his experience convinced him that potassium sulfocyanate, as a matter of fact, prevented further development of caries and reduced hypersusceptibility to toothache.

In 1906, when Dr. Low made his first report on the use of potassium sulfocyanate in dentistry to the Dental Society of New York the report covered a two years' experience with over 100 patients. Professor Kirk stated he had analyzed the saliva of hundreds of patients to see if it contained potassium sulfocyanate. In almost all of these cases he had found carious decay absent, arrested, or less in amount when the saliva contained a com-

paratively high percentage of potassium sulfocyanate.* Dr. Muntz, who had been associated with Drs. Low and Beach in their researches, found that patients who before taking these tablets had no potassium sulfocyanate in their saliva, showed traces of potassium sulfocyanate even seventeen weeks after taking them.

Dr. Muntz also found that women whose teeth were highly sensitive during pregnancy received very material relief from the use of these tablets. Inasmuch as potassium sulfocyanate is capable, by virtue of its solvent powers, Dr. Muntz felt justified in assuming that it dissolves the stratum with which the bacterial plaques are covered, thus greatly facilitating the washing away of the bacteria. He discovered that his own saliva contained more potassium sulfocyanate in the morning than in the evening.

Professor Smith of Boston ascribes the property of preventing caries to the disinfecting effects of potassium sulfocyanate, the continual secretion of which in the saliva acts as an ever-present disinfectant. In this respect the effect produced is very different from that obtained by the employment of mouth-washes, whose disinfecting effects cease very soon after use.

* [The above statement of fact with reference to the general immunity from carious action found in mouths in which the saliva showed a high percentage of sulfocyanates is not to be understood as committing the speaker to an acceptance of the theory that the presence of sulfocyanates in the saliva is the agent, or an agent, possessing the power to inhibit the activities of caries-producing organisms by its antiseptic or other action. The speaker quoted is of the opinion that the presence of sulfocyanates in the saliva of those who are relatively immune to the activities of caries-producing organisms is a coincidence, and not the cause; that immunity from dental caries does not arise from any antiseptic property of the saliva, but from the fact that the saliva of immunes does not contain the normal pabulum upon which the caries-producing organisms thrive. This view is elaborated in full in the discussion of Dr. Low's report referred to by Dr. Hecht, and will be found at page 1034 of the *DENTAL COSMOS* for 1906.—ED.]

Professor Edinger had already experimented in the City Hospital in Frankfurt-on-Main with a number of sulfocyanate compounds to determine their value as disinfectants for cholera and diphtheria as well as their effect on staphylococcus aureus, and he had found them effective. His researches confirm Ziegler's statement that the presence of potassium sulfocyanate enables the saliva to act as a disinfectant. German dentists have also devoted themselves to the study of the effects of sulfocyanates in the saliva, particularly Prof. Dr. Michel of Würzburg. In 1901 he analyzed the saliva of 236 patients. He found that the decrease of caries is accompanied by an increase in sulfocyanic acid.

Again in 1902 he examined 604 patients. The results of his former investigation were confirmed. His experience tallied, furthermore, with that of other investigators of this subject—the saliva secretes a larger amount of sulfocyanate after potassium sulfocyanate has been administered internally; this increase even keeps up for some time after the patient has ceased taking it. Professor Michel and Dr. Gürber made joint experiments as to the relative merits of certain preparations in checking bacteria. They compared for this purpose potassium sulfocyanate washes with "odol," "irisol," "odonta," and "kosmin." They used a 1 per cent. solution of potassium sulfocyanate. Their experiments showed that a very much smaller percentage of germs developed with the use of potassium sulfocyanate gargles than with the use of odol, irisol, odonta, and kosmin. Dr. Aufrecht also tested the efficiency of potassium sulfocyanate in arresting the growth of bacteria. In these experiments he used weak solutions, 1 per cent. of potassium sulfocyanate. His results are similar to those already cited. He found that the growth of bacteria was more effectively checked by the use of these 1 per cent. solutions for a longer time than by the use of more highly concentrated solutions for a shorter period.

Dr. Curt Oppenheim of Berlin found that a $\frac{1}{2}$ per cent., a 1 per cent., and

a 2 per cent. solution of potassium sulfocyanate had no sterilizing effect upon some fermentation bacteria.

As fermentation bacteria in the mouth act upon deposits of carbohydrate food, forming lactic acid, which decalcifies the tooth substance, thus producing the first stage of caries, and as the sterilizing effect of potassium sulfocyanate in the mouth upon the *bacillus acidi lactici* might be rather doubtful, Dr. Geyger of Leipzig thought it best to recommend for a successful prophylactic treatment against caries the use of a preparation consisting of malt diastase and potassium sulfocyanate. The malt diastase is intended to hasten the dissolution and to remove deposits of food, which contain carbohydrates, thus preventing to a certain degree the accumulation of lactic acid in the mouth. The potassium sulfocyanate is intended to fight against the putrefactive bacteria which in the second stage of caries destroy and liquefy the organic matrix of the tooth substance left after the decalcification by lactic acid. The preparation of Dr. Geyger consisted of powdered malt 10 gm., malt diastase 5 gm., and potassium sulfocyanate 0.8 gm.; 100 tablets were made from this quantity. This preparation I have used in ten cases; two of these patients were pregnant women with highly sensitive teeth. In every case the saliva, when examined, showed a total absence of potassium sulfocyanate. In making my tests I took care to have the mouth perfectly clean and to preclude the possibility of error resulting from the remains of any lactic acid in the mouth. The reaction of the saliva was in each case alkaline.

In order to reduce the sensitiveness of the teeth in the two pregnancy cases, I interrupted the treatment of these patients for a fortnight. They were required to take four of these tablets a day for the two weeks. My results confirmed the experience of Drs. Low, Beach, and Muntz; the sensitiveness of the necks and the diseased parts of the teeth was materially reduced; an analysis of the saliva showed that it contained a large amount of potassium sulfocyanate. There seems

to me to be only one way of accounting for the reduction of the sensitiveness; it is the following: The potassium sulfocyanate being constantly secreted by the saliva forms with the softened calcareous substances of the teeth chemical compounds, probably such as calcium cyanate, potassium phosphate sulfocyanate, and ammonium phosphate sulfocyanate, which destroy the conductivity of the finest nerve fibrils.

The other eight cases have to do with boys and girls during the years of puberty, ranging from fourteen to twenty-two; these cases were the kind that baffle us dentists. In every case caries had set in again after a comparatively short respite, in spite of regular and careful dental attention.

Four months having elapsed, I again examined these patients, and found no further decay. They had only taken four tablets a day for a fortnight, yet when I came to analyze the saliva, four months later, I found positive color reactions. These color reactions justify the inference that the saliva contains a more or less satisfactory quantity of potassium sulfocyanate. In a very obstinate case of stomacace which I am just at present treating, these tablets taken internally have very effectively reinforced the local treatment.

To return to the caries cases: I used litmus paper to ascertain if the saliva were alkaline. To determine the presence or absence of potassium sulfocyanate I mixed in a test tube 2 ccm. of saliva with a like quantity of distilled water, and then added five drops of iron perchlorid. If the mixture took on the color of red wine it was a sign that the saliva contained the requisite amount of potassium sulfocyanate compound; if it took on an amber color, it signified the absence of potassium sulfocyanate; intermediate shadings indicated a more or less defective percentage of potassium sulfocyanate. I might here add that I have found the iron perchlorid test for potassium sulfocyanate a very valuable help in diagnosing whether the decay of the teeth in mouths which otherwise appear clean is due to retention of food between

the teeth or to the absence of potassium sulfocyanate in the saliva.

From my experience thus far I can recommend the use of potassium sulfocyanate in the following cases:

1. When caries frequently reappears in spite of all efforts to preserve the teeth.

2. For patients afflicted with rapid and wholesale decay of the teeth.

3. During pregnancy, to guard against caries and to reduce the hypersensitiveness of the teeth.

4. To reduce the hypersensitiveness of the teeth before they are to be filled, and before other painful operations are to be performed on the living teeth.

5. To guard against decay of the teeth among the poor.

6. To guard against decay of the teeth among public school children who are treated in the school clinics.

7. To reinforce the local treatment in cases of stomatitis ulcerosa (stomatocace).

SOME NEEDS OF THE HOUR.

By **B. HOLLY SMITH, M.D., D.D.S., Baltimore, Md.**

(Read before the Maine Dental Society, June 1909.)

IF talking about essentials were like going to a bank and getting enough money for the weekly payroll, or to market and securing the food for tomorrow's dinner, I should bring you to-day, instead of these words, some actual changes in our professional thought and action. I should do this even though you might reject the money as being tainted, or refuse the food as unpalatable. Instead, I come from Baltimore to Portland with a message of the importance of which I am thoroughly assured. I hope you will not regard it as scolding, but as a simple statement of my point of view in regard to our professional activities; a point of view not of one who claims to be a seer, but an interested spectator with twenty-eight years of practice and of teaching, of writing and talking to the fellows of his cult. I come in the hope that a fair discussion of this topic may be equally helpful to us all; that new light may illumine, and a more elevated point may be attained.

It must be conceded that the most important factor in enhancing the dignity and usefulness of our calling has been

our professional organizations. Here upon common ground the problems of the day have been threshed out and settled, not by the individual, but by conference of the members. If that has been so in the past, it should be much more so in the future.

There are few reflective minds but will contemplate with pleasure and satisfaction the growing respect in which the other professions and the world at large hold the dental practitioner. This position has been attained by concerted effort and organized action. The individual who has aided in this uplift by his exemplary character or unusual skill has been marked by a respect for and love of his calling, a jealous regard for its reputation, a zealous desire to enhance its dignity and increase its usefulness. And if there exists today a practitioner of dentistry so inconceivably small as to be ashamed of his calling, to practice it without honoring it, he is not to be found on the roll of membership of this Maine Dental Society, but segregated in his own meanness. Scott's words might be appropriately applied to him:

If such there breathe, go mark him well:
 For him no minstrel raptures swell;
 High though his titles, proud his name,
 Boundless his wealth as wish can claim,
 Despite these titles, power, and pelf,
 The wretch concentered all in self,
 Living shall forfeit all renown,
 And, doubly dying, shall go down
 To that vile dust from whence he sprung
 Unwept, unhonored, and unsung.

The founders of our profession, with high prophetic vision, early foresaw the importance to dentistry of organized societies both local and national, and Horace M. Hayden, who has been called the father of dental organization, made it the effort of his life to bring together into one society the prominent and worthy practitioners of the various cities of our country. This effort was more or less successful, and to this spirit engendered and example set we ascribe the organization and life of all the societies having other than local pretensions which have succeeded each other since that day. Two of these societies, the American Dental and Southern Dental Associations, were coexistent, and while they were not exactly rivals, there was in a sense an alien feeling on the part of members of the one toward the organization of the other. From this position of divided authority there finally evolved the present National Dental Association by the union of the two organizations. In effecting this organization it was necessary to make concessions to both of the constituent societies, and though by those unfamiliar with the difficulties encountered some criticism has been made of the plan of organization, it was upon the whole the best that could be secured, and one that has been effective in building up a single authoritative body, which has exercised its functions and performed its duties in a creditable manner. The best that could be done then, however, is not considered good enough for the present, and at the last epoch-making meeting held in Birmingham some radical changes in the constitution were proposed, which, when put in operation we believe will be effective in so strengthening the National Association as to make

it compare very favorably with the American Medical Association. In order to accomplish this, however, it will be necessary to obtain the active support and co-operation of the state societies. At the Birmingham meeting twenty-six of these societies, through representatives present, signified their intention of joining the National in a body, paying into the treasury two dollars per capita, and receiving the National journal for each of its members. The publication of the journal is to begin next year. The need of the hour is that the Maine State Dental Association shall fall in line, and do its duty in making this National Dental Association all that it ought to be as a representative of our profession.

Perhaps the most often-repeated criticism of the National Dental Association was directed at the executive council. Composed as it was of five members, it was claimed that the affairs of the association were in the hands of too few. I have been a member of this council, with the exception of one year, ever since its organization, and I know its official conduct has been open and above-board, and that its duties have been administered in an impartial and honest manner. Yet with the prospect of a largely increased membership, the Committee on Revision of the Constitution proposed that the council should be composed of fifteen members, five from each section, viz, East, West, and South, these members to be elected by a caucus of the members present from the sections named. The adoption of this plan will make a house of delegates, each member representing about the same number of constituents as do members of the corresponding body in the American Medical Association, which has a membership of 35,000 and a house of delegates of 150. When the membership of the National shall exceed 3500, the house of delegates may be proportionately increased.

The publication by the National Dental Association of a journal reporting its proceedings and representing the interests solely of the profession, is a step to be acclaimed, and will require much per-

sonal sacrifice for its accomplishment. It has been contemplated for a long time. Sporadic efforts have been repeatedly made to divorce from the supply house the official voice of the profession, the editorial dicta of its interests. These commendable trials have not been uniformly successful, for the reason that the editor-publisher and the friends of the organ possessed "wishbones in place of backbones," to quote the editor of *Farm Journal*; but with an organization of several thousand and an assured circulation, such a journal may rear its head independently and with every hope of permanence. This effort, however, involves you and your support. It means that you must be a partner in the concern, that Maine has as much interest at stake proportionately as New York or any other state, and that this society must look after Maine's professional interests in this matter. This is one of the foremost "needs of the hour." The individual congressman may absent himself from the sessions of Congress, may fall asleep in his seat in the House, but when the sergeant-at-arms appears with his mace and summons him to duty he dares not disobey. The individual practitioner in the state of Maine may be content to let ten years of effort pass by without his taking notice, but when your society demands of him that he shall do his part, he cannot escape his duty.

Perhaps the most significant and important incident of the year in dentistry was the organization of the Massachusetts Council of Oral Hygiene, and from the example and influence of this action the foundation of a similar council in a neighboring state. The impression which this effort made and the important people which it involved will unquestionably work a great good to our profession, in that it brings us in line as unselfish philanthropists, working for the physical uplift of our fellows. This example will be followed by other states, until nowhere will the doctrine of a clean mouth not be preached and insisted upon. This is a part of the public work of our profession, and if we shirk it we are not entitled to recognition by our mother or sis-

ter professions. Who knows better than the dentist that ninety-five per cent. of the school children are dental cripples? Who knows better than the dentist that in the mouths of these dental cripples are to be found numerous human culture tubes, incubators of the germs fatal to life and health, the germs of such diseases as pneumonia, diphtheria, la grippe, and even tuberculosis? We as a profession owe a duty to the public. Can any of you say that this service shall be delegated to the medical man? Do any of you think that the service could be well rendered in such hands? Because of its organization the medical profession is doing a great work in instructing the public as to hygiene, but to be complete they are calling in the dentist. Why not do it ourselves? Why not in every community organize a movement for dental inspection in the schools and for infirmaries for dental and helpless cripples? This is one need of the hour. Before dentistry will ever come into its own as a member of the liberal professions, it will have to achieve a reputation for altruistic public service, and this cannot be done by the individual, however helpful his gratuities. At the last meeting of the National Dental Association a public session on oral hygiene was held, to which the citizens of Birmingham were invited. The hall was more than full, and addresses both technical and instructive were made. Addresses and discussions were listened to with apparent interest, and we believe much good has been done.

Assuming that we have the privilege of authoritatively shaping the course of instruction in oral hygiene and denying the right of supervision on the part of medical practitioners, it behooves us to respect in the fullest sense the demonstrated necessity for asepsis in our individual practice. This is an hour of awakening, when the practitioner must be also a preacher, when individual service must be rendered with words of counsel which shall educate the patient.

When in our colleges ample and efficient instruction is given, as is usually the case today, as to the necessity of hygienic

surroundings and conduct in the dental office, it might seem unnecessary to discuss at this time and before this audience office hygiene. The reproach that the "dentist is dirty" perhaps has its origin in the comparison of up-to-date surgical procedure with the *modus operandi* of the older practitioners of our calling, and the stigma is due to an unfriendly criticism by the members of a sister profession. However this may be, we must recognize that there is everywhere abroad a high regard for the importance of measures which will prevent contagion and infection. And if we aspire to authority, we must adopt advanced measures. With this in view the dentist owes a duty to his calling and an obligation to his patients to place his practice above reproach, to render a service which cannot be criticized from any standpoint. The mouth as a field of operation possesses to a rare degree immunity from infection; in addition to this, it is practically impossible to sterilize it, but those who will have opportunity to criticize our course perhaps do not know these facts as well as we do. Hence it is far better for our individual reputation as well as that of our calling that we pursue a course of strict adherence to surgical cleanliness.

The dental office, as the surgery, should be absolutely neat and clean, and stocked with snowy linen in abundance. The napkin on the head-rest, the bib, the

hand-towel, should invariably be used for one patient only. An abundance of wastebaskets as receptacles for refuse linen, cotton, or paper should be kept, so as to avoid dropping these bits on the floor. Glass-top surgical tables, on which can be arranged glass jars containing cotton rolls and glass trays for antiseptic solutions, give to the office an appearance of cleanliness.

Our instruments when used in any one case should be washed with brush and soap, steeped in formalin solution, and then be passed with forceps to a tray of alcohol. This is sufficient sterilization in all cases except when handling specifics, then the sterilizer with its soda solution may be brought into requisition. Surgeons are finding that the temper of a blade is never improved by the formerly accepted plan of sterilization, and many are resorting to mechanical means of cleansing instruments, to be followed by the alcoholic bath. This has been found to be effective, and it is the most satisfactory method for the dentist.

Our great need is to cultivate the aseptic spirit, the determination, whether we consider it necessary or not, to faithfully carry out in every instance the detail of presenting to each patient ourselves and our equipment attractive and thoroughly aseptic. Let us band ourselves together to lift from our beloved calling the reproach of past years.

PROPHYLAXIS IN DENTISTRY.

By HENRY A. KELLEY, D.M.D., Portland, Maine.

(Read before the Maine Dental Society, June 1909.)

PROPHYLAXIS in dentistry has received considerable attention in the past few years, and I cannot expect to say much that is new or original, or much that those of you who read your dental journals assiduously have not seen expressed before. My object, then, in reading this paper, is to further interest you in the subject, and especially to urge a more widely spread interest in all that prophylaxis in dentistry means.

I have said this subject has received quite a lot of attention in the past few years. What I mean, to be more exact, is this: If you search your dental journals for articles on this subject you will find them fairly numerous. You will find here and there, in most of the larger cities a man or woman or two deeply interested in this subject. In the very large cities you will find in the leading offices a specialist in prophylaxis and in the treatment of pyorrheal conditions.

But, on the other hand, to show how little widespread is this interest, I want to read you this abstract from the report of the Committee on Oral Hygiene by Dr. J. P. Corley of Alabama. This is the report made to the Southern Branch of the National Dental Association in May 1908. Before quoting, I wish to read a passage from a paper by Dr. I. N. Carr, also presented at the same meeting, which will serve as an introduction to Dr. Corley's statements.*

I wish you knew Dr. Corley, for you would understand this report so much

better, understand his intensity. I wish to again quote: "We are not parading our dirty linen for the pleasure of the display, but for the purpose and in the hope that we may better show the cause and suggest the remedy," so that you may understand this fearful display of dirty linen, and why Dr. Corley holds it up for your inspection.

The subject of prophylaxis and oral hygiene takes in almost all of the advancement of dentistry that is going on outside of the development of the purely mechanical phase of our profession.

Prophylaxis comes from the Greek words meaning "before" and "to guard," the definition being "defending from disease—preventive." In dentistry this embraces all that is being done to educate the public, the care of the teeth of the school children and of the poor, of the soldiers and sailors of our country, of those detained in state institutions, as well as of our regular patients as it has to do with preventive dentistry. It embraces all that is being done in the study of the saliva and the attempts to modify the saliva in disease so that tooth decay may be arrested or prevented; all that is being done in orthodontia, wherein the correct alignment of the teeth prevents and corrects conditions that tend to produce and hasten decay.

This, as you will see, embraces a great deal that marks the progressive dentistry of today and that is tending to place us alongside of other specialists of medicine whose watchword is to prevent rather than to cure. Let me quote from Professor Osler, who during his life in this country probably held *the* place at the head of the profession of medicine: "You

* See Transactions of the National Dental Association for 1908—Southern Branch section, p. 299—for Dr. Corley's report, from which quotations were read.—H. A. K.

have one gospel to preach, and you have to preach it early and late, in season and out of season. It is the gospel of cleanliness of the mouth, cleanliness of the teeth, cleanliness of the throat. These three things must be your text throughout life. Oral hygiene, the hygiene of the mouth—there is not one single thing more important to the public in the whole range of hygiene than that, and it is with that that you practitioners of dentistry have to deal.”

It seems hardly necessary for me to call your attention to the dire necessity of prophylaxis or to defend before you its principles, but when I recall the conditions of mouths that are constantly presented to me, and have these patients tell me that Dr. So-and-so told them that there was nothing to be done for such conditions, I know that we who believe in and practice prophylaxis must preach it early and late, in season and out of season.

From the examinations of the mouths of children between the ages of nine and twelve from nearly all sections of the civilized world we can confidently say that over 90 per cent., at least, have defective teeth. Dr. Wheeler of New York city makes this statement: “As the result of the examination of the teeth of the children of the city of New York I make the assertion that if all the teeth that need filling in this city were being filled there are not enough dentists in the whole country to take care of the teeth of this city alone.” As we have every reason to suppose that this condition in New York is only typical of every section of the country, how, I ask, are we to meet it when we have succeeded in educating the people to the necessity of the proper care of their teeth?

Must we not prevent the ravages of this most common of all diseases that attack man, and must we not grasp the system of prophylaxis that helps us so much? Certainly no child brought up on prophylaxis can have anything like the extensive caries that one who is not undergoing this treatment will surely have.

Moreover, prophylaxis means some-

thing more than just cleaning the front surfaces of the teeth for appearance' sake. One of our most serious dangers is that after the fine start already made by our enthusiasts, the quack and the unthorough dentist will rush into this field, attracted mayhap by the fine-sounding word prophylaxis, and ruin it all with the way in which *he* will practice prophylaxis. This is ideal dentistry, and it takes an idealist to practice it. Some one has said that the quack must take every good thing in dentistry and bring it to its lowest point, and then the thorough worker must take and bring it up to its highest possible standard. This, I think, was said especially of crown and bridge work, and when we recall the fearful work done along this line, it does seem as if crown and bridge work were soon to be brought down to its lowest point. This is interesting to us in this connection, because we find that the most unhygienic oral conditions are quite as often due to faulty crown and bridge work as to any other one cause.

The aim of prophylaxis is to place the mouth in as clean and healthy a condition as possible. How does it achieve this aim?

However interested you may be in the practical side, unless you thoroughly understand the necessity for prophylaxis, you will not be thorough in your practice of it, hence this prelude to the practical side.

Let us start with this idea. If the teeth were perfectly formed and we could keep them perfectly clean, they would not decay. They are, however, not perfectly formed, neither can we keep them perfectly clean. But, taking our teeth as they are, the more nearly perfectly clean we can keep them the less they will decay. Can that be disputed? Prophylaxis aims to keep the teeth and the mouth as nearly clean as possible, and thus has a perfectly reasonable *raison d'être*. Above all things, I want to impress upon you that the work must be done thoroughly, and after a clean condition has been obtained it must be retained all through life. In the practical case of an average adult patient, the the-

ory of prophylaxis is first explained, and the patient's interest is gained, also her consent is secured to be put on the list of prophylaxis patients. Then all dental work not up to standard is brought up to the best standard. Any ill-fitting bridges or crowns are replaced with bridges and crowns that are correct in their construction, especial attention being paid that all bands, when used, are so constructed that there is no gum irritation. Any abscessed teeth with chronic fistulæ are properly treated, and the fistulæ cured or the fistulous teeth extracted. All fillings irritating the gum are properly finished or replaced with perfect ones. All fillings not properly contoured, leaving spaces for the accumulation of débris and decaying food, are replaced with properly contoured fillings. If tartar is present, it must be removed, and the roots are polished and the pockets healed.

All this is nothing new, to be sure, but before a mouth can be placed in a hygienic condition these preliminary steps must be taken in a more thorough way than I dare say you have ever done before, or else one single defect will stand out like the dirty corner in an otherwise clean room. I may possibly talk forever without impressing you with the beauty of the cleanliness of a mouth under prophylactic treatment, but just one look into a mouth under such treatment would surely convince you at once that no gum-irritating crown, bridge, or filling can have a place in such a mouth, which is as near to the perfection desired as we can get. After all preliminary work is done, we come to what perhaps is understood by you as being the prophylactic treatment. If tartar be present, the unsanitary condition is not cured, for you will in all probability have done your preliminary work long before you effect a cure of this condition. In fact, it is only since this treatment has been introduced into my practice that I was able to effect a cure of pyorrheal conditions. In beginning our spraying and polishing, the first condition that confronts us is a viscid coating of saliva and gelatinous plaques that covers the

teeth and gums. First take a tube of rather hot water, of about 150° F., to which has been added one dram of aromatic spirits of ammonia. The alkalinity of this spray, applied under a pressure of from 35 to 50 pounds, will overcome this viscosity. After thorough spraying with this first spray, alternate with a second spray, composed of three-quarters of a tube of warm water and one-quarter of a tube of some of the forms of hydrogen dioxid. To this tube add a few drops—three or four—of essence of anise to disguise the very unpleasant hydrogen dioxid taste. This second spray is used on account of its cleaning effect. As the dioxid comes in contact with the decaying particles of animal matter we have the well-known boiling effect, which tends to lift out and off all foreign matter accumulated around the teeth. Then with a hand porte-polisher (I use Harrell's) charged with flour of pumice begin the polishing. The pumice must be moistened with water to make a paste not too thin, to which two or three drops of essence of peppermint are added. The peppermint serves not alone to take away the sandy taste, but also to exert a cooling effect on the gums, and leaves a refreshing and clean taste in the patient's mouth after the operation is finished. I usually go over all the teeth in a rather hurried way in order to first get rid of any matter adhering to the surfaces, and then after another spraying, alternating with both sprays, I pass to the last tooth on the upper left side and go over all the buccal and labial sides of all the upper teeth, going into the approximal spaces as well as possible with the porte-polisher. Use flattened orange-wood points for the flat surfaces, applying considerable force with a circular movement directed from the neck to the cutting edge and just under the gum margin. This gum margin is a very important region, and it is probable that if this is kept well polished your patient will never have pyorrhea, or if he has had it, it will never return. Having gone around to the last tooth on the upper right side, spray again with the second spray, and return to the last tooth on

the upper left side, going over the lingual surfaces and then spraying with the second solution. Then polish your grinding surfaces. The same process is followed with the lower teeth. Go over all exposed surfaces with your porte-polisher charged with tin oxid made into a paste, which will impart a beautiful polish to these surfaces. Then apply a thorough spraying with a third solution, which consists of one-half a tube of hot water to which has been added one-half a tube of some pleasing general mouth-wash (I use Alkalyptol, which I find very satisfactory; not all antiseptic mouth-washes leave the same refreshing taste in the mouth), and pass waxed floss silk between all the teeth and clean out the interproximal spaces, spraying with the second solution as necessary. After that finish with the third spray, finally allowing a rinsing-out with a glass of cool water. If your work has been thorough, your patient has the first sensation of what a clean mouth means. Patients often tell me that they hate to go home and eat and soil the mouth again.

It is well to alternate from month to month, taking the upper teeth first in one month and the lower teeth first the next month. I find that for some reason which I cannot explain, the upper teeth respond to treatment, especially in pyorrhea cases, much more readily than the lower ones, and I have these two thoughts to offer in this connection. I find that when I begin with the upper teeth I often spend forty minutes going over them, which leaves me but twenty minutes of the hour appointed for the lower ones; hence the practice of alternating from month to month. The pumice also becomes much thinner from the admixture of saliva in polishing the lower teeth. I often use the saliva ejector or napkins to offset this latter condition, but I cannot as yet say with what result. As you first begin to polish with the pumice, your wood point will slip over the tooth, and there will be a slimy, greasy sensation. But as you polish and polish, you get down to the clean tooth-surface, and then you experience that squeaky sound that indicates a clean

tooth-surface. The slimy substance that you are removing is composed of the gelatin-forming micro-organisms, which I shall explain later in a quotation from Johnson. Hence, if you make every filling smooth, allow no shoulder or lodging-place for the decay-producing germs to remain, and then destroy the gelatinous film under which the micro-organisms that cause decay are enabled to effect their destructive process, you render it extremely hard for decay to begin or make progress. In this connection I wish to read a quotation from Dr. Johnson.*

Could there be a more reasonable justification of prophylactic treatment than that? The first treatment, then, must be followed by a lecture and "wash-bowl demonstration" to your patient as to how to care for the teeth, and a proper tooth-brush, powder, wash, and silk are either supplied or ordered.

Prophylaxis itself can accomplish almost nothing without the aid of intelligent home care of the teeth, and in this I follow the teaching of that splendid lecture delivered at Rockland by Dr. A. C. Fones. Those of you who missed that lecture and the paper on Adenoids by Dr. J. H. Allen read at the same meeting have missed two of the finest papers ever presented before this society.†

Within one month after the first treatment the patient is required to return for another prophylactic treatment. Something of course will have been gained by the first treatment, but not until you have given nine or ten treatments will you find that the patient presents a mouth practically as clean as it was when he left a month before. We can then say that the mouth is up to standard, and the problem then is to keep it so. It is possible that after the first year of such

* The quotation read was from Dr. C. N. Johnson's "Principles and Practice of Filling Teeth," 3d edition, pp. 28-32.

† In this paper I could not go through this lecture and demonstration to the patient. The reader will readily gather the idea, and will probably have his own conception of what it should be.—H. A. K.

treatment the intervals between treatments can be prolonged to six weeks or even to three months, but never longer than that. It is undoubtedly better to make the time too short rather than too long. You will also find that the time required for treatment can be reduced to half an hour, or even twenty minutes in favorable cases. The entire management of the patient must be left in your hands. As soon as a sitting is over, make the next appointment, and be as careful that your patient keeps that appointment as you are with any other, impressing him with the idea that this appointment is as important as any. After a time the patient will say, "My mouth is so clean that it does not seem to need further treatment," and it is to your undoing if you do not insist that the very essence of this treatment lies in the fact that these beautifully smooth and clean surfaces cannot be maintained except by regular polishings at short intervals.

Any departure from this rule means a return to old methods and to the idea that any mouth the teeth of which look clean on the buccal and lingual surfaces is clean enough because external view does not disclose any filthy portions.

Prophylaxis demands that each and every surface of each and every tooth shall be so clean that careful examination even by the dentist shall not reveal any unclean surfaces or gum irritation. When you look into such a mouth, you will indeed call it the "mouth beautiful."

Time does not permit to go into the benefit to be derived from this treatment for the entire system, nor into the aid which it affords in the treatment of all digestive, throat, lung, and nose diseases. Nor can I enter into the subject of pyorrhea. But I must say just a word to emphasize the hope that at last we seem to have a treatment that will render it possible to combat this fearful and heretofore incurable disease. Upon observing how the most distressing cases improve under this treatment—how every month, or even every two weeks the inflamed condition of the gums subsides, so that tartar that was inaccessible before can easily be reached until it is entirely removed and a lasting condition of the total absence of pyorrhea is obtained, one cannot but bless the prophylactic treatment.

In closing, let me impress upon you this one thought: Be thorough, and keep it up!

CORRESPONDENCE.

A USEFUL APPLICATION FOR ALLAYING PAIN IN PULPITIS.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—I wish to contribute a small help to suffering humanity, and beg you to publish in the DENTAL COSMOS the following remedy. It will instantly stop pain caused by exposed irritated pulp. I have tried it in hundreds of cases without a single failure:

Make a creamy paste of bicarbonate of soda with carbolic acid, and cover the aching pulp with the same.

For painlessly destroying an exposed

pulp, apply a very small quantity (smaller than a pinhead) of pure arsenous acid mixed with carbolic acid; over this put the above-named paste and seal with wax or the like.

I would wish that my remedy be called "Dr. Gerdtzen's remedy" for pulpitis (from exposed pulp).

Very respectfully,

OSCAR GERDTZEN, D.D.S.

VALPARAISO, CHILE, September 7, 1909.

PROCEEDINGS OF SOCIETIES.

NATIONAL DENTAL ASSOCIATION.

Thirteenth Annual Meeting, Birmingham, Ala., March 30 to April 2,
1909.

SECTION II: Operative Dentistry, Nomenclature, Literature, Dental Education, and Allied Subjects.

Chairman—W. G. EBERSOLE, Cleveland, Ohio.

Secretary—L. L. BARBER, Toledo, Ohio.

(Continued from page 1219.)

SECOND DAY—Wednesday.

(Continued.)

The next order of business was the reading of a paper by Dr. J. R. CALLAHAN, Cincinnati, Ohio, entitled "Root-Canals."

[This paper is printed in full at page 1253 of the present issue of the COSMOS.]

Discussion.

Dr. A. H. PECK, Chicago, Ill. Dr. Callahan has covered his subject so thoroughly that there is little of value to be said in addition. In fact, if I were to follow my own personal inclination, I would simply adopt the rule which so many follow in discussions, and compliment the author on the thoroughness with which he has treated his subject and take my seat. There are, however, two or three minor points which I think it will be well to refer to again. I would voice just a word of caution in connection with the use of sulfuric acid which I believe will be of some value, not especially to the older practitioners, but to the younger and more inexperienced men who may read this paper. You will observe that the essayist in presenting this

subject has carried throughout the idea of success, and if his paper were to be left with us without further comment, we would gather the idea that he is uniformly successful in his efforts to enlarge root-canals by this method. Maybe he is—I hope he is. I have had some trouble with this method and have found root-canals which I was unable to successfully or satisfactorily enlarge by this or any other method.

In regard to the use of sulfuric acid, even in a forty per cent. solution, the statement was made that no special trouble can result in this connection, because the acid is self-limiting in its action on the tooth-structure. That statement without qualification I believe may mislead the younger and inexperienced practitioners, because we all know that this acid is not self-limiting in its action on tooth-structure. It may be more comprehensive to say that the self-limiting action of sulfuric acid on tooth-structure depends on the quantity of the acid used. Of course a comparatively small quantity is applied in this work, and probably in the great majority of instances not enough of the acid is used to result in any damage, but I have experienced trouble in its use in this con-

nection. It does not require very much sulfuric acid, even of a forty per cent. solution, when it comes in contact with the soft tissues, to bring about a very considerable irritation, and any irritation produced in the soft tissues about the apical space is not always easily abated.

The use of an alkaline solution in connection with this work was not sufficiently emphasized. It is my habit, when using sulfuric acid in this work, to apply an alkaline solution—sodium bicarbonate or something equally effective—afterward, in order to be on the safe side. This does not take much time, and especially after the last application of the acid I think it well to use the alkaline solution as thoroughly as possible. For carrying the acid I use an iridio-platinum broach, which can be procured from the dealers. These do not corrode from the action of the acid and are very much less liable to break in the canals than the ordinary steel broaches.

Dr. J. D. PATTERSON, Kansas City, Mo. A paper upon root-canals is in my opinion always timely. Often, when the topic of the treatment and filling of root-canals is suggested at dental meetings, immediate objection is raised to the discussion of a subject so trite and threadbare. As the essayist suggested, the average success in this operation has been alarmingly inadequate, and has brought upon our profession merited as well as unmerited criticism. Therefore suggestions for an improved technique and therapy in root-canal treatment are of vital importance.

Dr. Upson, in the extracts cited by the essayist, has made observations which demand the careful consideration and study of every member of the National Dental Association.

He is not the first of prominent medical specialists who have criticized the ordinary and accepted procedures in respect to what the medical profession and the laymen are pleased to call "dead teeth," and advocated their elimination. Some years ago Drs. Sexton and Theobald of Baltimore, specialists in diseases of the eye and the ear, gave similar

warnings to the dental profession. The closing paragraph in the essayist's quotation, viz, "It is only possible for me at present to make the broad general statement that irritation and septic poisoning shall be removed in every case, and that local results of dental lesions are trifling in comparison with their profounder effects on general health," leads us to the inevitable proposition that, if we cannot divorce infection and irritation from dead teeth, they should be removed by the forceps.

Is it possible that we too often, in our zeal for the preservation of dental organs, trust too much to the kind efforts of nature? In our belief that the tissues will absorb irritations, mechanical, chemical, or resulting from micro-organic life, without too great a strain, are we asking too much? When with all mechanical ingenuity, and with the aid of therapeutics, we have placed the root of a tooth in what we consider a promising condition, and are disheartened to see chronic inflammation and discomfort supervene, do we properly consider what may be the outcome of such confidence in the germicidal qualities of the tissues and strain upon the organism? In our longing for bridge supports do we not too often build upon toxic supports? Does the orthodontist, in his strenuous claim to never sacrifice a dental organ for the sake of occlusion, properly consider what may be the result of his ill-advised fight for a hopeless first molar? Does the pyorrhea specialist who "saves everything" (?) ever turn his thoughts to the strain which he is placing upon the *vis medicatrix naturæ*? I think not. Therefore the question brought to our minds by the essayist, no doubt prompted by careful clinical observation and perhaps incited also by the pungent criticism of Dr. Upson in the extracts quoted, contains a note of warning.

What is the lesson to be learned? It certainly behooves us to use every energy and to test all methods by which root-canals can be placed in better aseptic condition. Dr. Callahan presents to us a method introduced by him some years ago, and demonstrates to us that his con-

tinued success in so treating root-canals prompts his belief in its efficacy. Other practitioners, too, have introduced this method in practice and speak favorably of it. If it will lower the percentage of failures and preclude the harrowing effects of nerve-strain which may result in mental derangement, it must greatly appeal to all of us. I fear that we have allowed ourselves to drift into treating root-canals and subsequently filling them in the "easiest way," with little conception of the risk, and when irritation and chronic abscess appear, we dismiss it with the remark that "no harm will result," especially so when the delinquent tooth furnishes anchorage for a valuable piece of bridge work.

The essayist tells us that the "key to the situation is the last one-eighth of an inch of the canal at the apex of the root." We must agree with that statement, as clinical experience confirms that success or failure depends upon the treatment of that portion.

What the essayist says respecting this treatment should be most carefully tested.

When I received the first draft of the paper, the advice regarding the filling of the root-canals had not yet been embodied in it; and to leave the subject at the point of root-preparation ready to receive a filling seemed to me totally wrong, for it is my belief that subsequent irritation depends very largely upon how the root is filled after having been properly prepared. Therefore the description of the technique of filling roots which was added later to the paper was very welcome.

The essayist mentions the various methods of root-filling, and expresses the opinion that in the apical third chloro-percha forced to place with a red gutta-percha cone should be used, and that in the pulp-chamber and the remaining portion of canals zinc oxychlorid is most satisfactory.

I am certainly pleased to be in accord with his belief in zinc oxychlorid as a root-filling material. I was taught its value first by the late Dr. W. W. Allport of Chicago, who used it for that purpose, and pressed it to place with cones of

No. 4 non-cohesive gold foil rolled upon a fine broach.

Many years ago I made numerous experiments with gutta-percha, chloro-percha, oxychlorids, oxyphosphates, shellacs, and amalgam in root-canals of freshly extracted teeth, and in glass tubes simulating the form of tooth-roots, which were afterward subjected to aniline solutions. I found that the oxychlorid root-filling was the most impermeable of all, with the exception of dry amalgam. (Amalgam for general use is of course only permissible if sufficient space is present.) Chloro-percha, reinforced with gutta-percha points and pressed to place when the solution is hardening, still shrinks so that the anilin solution freely permeates it. Shellac in solution, or heated, is finally permeated. Oxyphosphate, while shrinking slightly as compared with chloro-percha or warmed gutta-percha, still shrinks so as to allow the anilin to penetrate between the dentin and the filling material. Tin foil or gold foil alone cannot be placed in a root so as to prevent penetration. Oxychlorid does not shrink nor exhibit such objectionable characteristics as the above materials; it is penetrated more slowly by the solution than any other material tested—with the exception of amalgam. While it is certainly true that different cases demanding root-fillings require different treatment, I am strongly of the opinion—my opinion having been gained from the removal of all kinds of root-fillings exhibiting a variety of irritations and odors, and also from the experience of others—that a root-filling made as perfect as possible with zinc oxychlorid is the best root-filling known today, and will best prevent the leaving of a space where moisture may penetrate and where germs may produce toxins, bringing about the dire results noticed by Dr. Upson.

I confess that I am so suspicious of chloro-percha as a root-filling that no such solution is in my office. If I desire a solvent, I use preferably oil of cajuput in very small amount, and generally I seal the apical third (or rather fifth) with a gutta-percha point of the

white variety, because it shrinks less than the red, surrounded with zinc oxychlorid, preferring the risk of going a little beyond the apex to the *certainty* that if chloro-percha is used leakage will ensue.

I also confess that in cases in which inflammatory conditions have been continued so long that we may judge that the apical territory is very weak in resistance and that future trouble may ensue, I sometimes fill permanently with white gutta-percha points surrounded with a smear of zinc oxid, cresol, and formalin, as found in the preparations known as "oxpara" or "triolin." They may disintegrate, as our essayist has told you, but I have not found that they irritate, and besides, in suspicious cases the filling may be subsequently removed for additional treatment.

In closing, I would emphasize again that this subject is of great importance, and let no one believe that even our best methods of treatment are not susceptible of correction and improvement. Dr. Callahan deserves our thanks and appreciation for his effort.

Dr. A. J. COTTRELL, Knoxville, Tenn. I do not care to enter into a very lengthy discussion of this paper, but would like to state the results of my own clinical observation and experience. Dr. Callahan suggested this treatment to the profession about fifteen years ago. I was at that time laboring under the need of an effective method, and at once adopted Dr. Callahan's suggestions. His statements have been ultra-conservative; he has exaggerated nothing, rather he has not told all the possibilities of this method. I do not believe that any more valuable suggestion was ever made to dentistry than that of sulfuric acid treatment for root-canals. Dr. Peck's assertions to the contrary notwithstanding, there is not the slightest danger of any permanent injury resulting from the use of sulfuric acid in root-canals. I am not basing this statement on scientific analysis, but on actual experience extending over a period of fifteen years.

Dr. RICHARD L. SIMPSON, Richmond, Va. In my opinion, Dr. Callahan has done more than all the other members of

our profession to stimulate the successful manipulation of root-canals. His work has inspired my own in this line. For this reason I feel like repeating here the adage, "Fools rush in where angels fear to tread." But duty to my convictions demands that I tell you that in my opinion the advocates of the sulfuric acid method (Callahan's) derive most benefit from the acid as a lubricant and antiseptic, just as oil or soapy water is used in drilling iron. Let someone, unknown to Dr. Callahan, substitute any liquid antiseptic for his fifty per cent. sulfuric acid, and he will open canals just as successfully. The mental effect lends him courage and gives him confidence. Dr. Callahan is also deceived in thinking that he is enlarging the canal, when in reality the broach is being made smaller by the acid, also more brittle and thus more liable to break.

My technique is different from his to some extent, and if you will pardon me for a moment I shall illustrate on the blackboard what I mean [illustrating]:

(1) Antisepticizing the canal contents by allowing the liquid antiseptic (Buckley's) to reach the apex by means of capillary and vacuum force, induced by a smooth and slender explorer made from a worn-out barbed broach.

(2) Enlarging the canals by "extra fine" barbed broaches and "medium" Fellowship twist broaches, to be used with an in-and-out movement, facilitated by the liquid antiseptic, which acts as a lubricant. The twist broaches can also be twisted, as their name implies.

(3) Absorbing the milky débris formed by the above action with shreds of cotton wound around smooth and slender cotton carriers. This cotton acts like a washrag.

Dr. S. D. RUGGLES, Portsmouth, Ohio. This very excellent method of root-canal treatment has saved my life, so to speak, several times, and perhaps that of the patient. I do not care to discuss this paper, but I wish to say that this body has recognized the necessity for a definite nomenclature, and yet we have heard the speakers and the essayist use

terms that are not in conformity with that recognized nomenclature. So I should like to suggest that the term "nerve" be dropped hereafter, and that the word "pulp" be substituted. Apropos of this subject, the word "fang" is also obsolete, and the term "sixth-year molar" should be dropped.

Dr. M. L. RHEIN, New York, N. Y. I cannot allow this opportunity to go by without emphasizing the splendid method which Dr. Callahan presented to us several years ago of using sulfuric acid in breaking down osseous constrictions, so to speak, in the canals. I also wish to emphasize my approval of his technique in filling and sealing root-canals. All the difficulties which I have encountered owing to pathologic conditions arising from imperfect root-fillings and root-fillings of zinc oxychlorid at the end of the root have in a large measure been due to the powerful irritating effect of this substance after penetrating the foramen, and I have come to the conclusion that we have nothing so compatible with the soft tissues around the end of the root as gutta-percha. In my opinion it is advisable, if we go to any extreme, to have some of the gutta-percha protrude. If my understanding of the technique is correct, the chloro-percha is used only as a sort of gluey substance, the cone of gutta-percha being the real filling substance. For some years past Dr. Dunning of New York has been experimenting with paraffin and subnitrate of bismuth as a root-filling material, and while the work is only in the experimental stage, I believe that we may look forward to a most promising root-canal filling material. I do not wish to leave the impression that zinc oxychlorid has no place in our work. I thoroughly agree with the essayist in attributing to it so much importance—after the end has been sealed with some non-irritating substance. Make that substance as small as possible, but place the zinc oxychlorid above it.

It has been my good fortune for some years past to demonstrate a scientific technique for this purpose, and I am

pleased to see that Dr. Callahan has adopted the use of sodium and potassium for destroying the organic substances in the canals, which make up the major portion of the canal contents.

In closing, I wish to say that the difficulty in root-canal treatment is due to the lack of willingness on the part of the operator to devoting sufficient attention to diagnosing the irregularities of the roots, and to the means of obtaining a straight line toward the end of the root, also to give time to getting to its end. If he follows that course he will succeed, admitting of course that there is a certain percentage of roots that we cannot succeed in filling properly; but that percentage is so infinitesimal that it is not worth considering.

Dr. L. A. SMITH, Port Gibson, Miss. I should like to ask the essayist if he has ever used hydrochloric acid in this connection? It will attack the inorganic tissues more vigorously than sulfuric acid, and as it is only slightly caustic to the soft tissues, I have for some time given it preference in the treatment of pyorrhea.

Dr. CALLAHAN (closing the discussion). I wish to say in the beginning that I specifically stated in my paper that there are many roots which it is absolutely impossible to fill properly, thus answering the question raised by one of the gentlemen.

One of the speakers took exception to my method of locating the point of constriction. The diagrams are not anatomically correct, but are simply drawings made from specimens to convey the idea.

One gentleman spoke of the method of opening root-canals by the use of the Buckley solution. Very possibly he has lost sight of the principal reason why I wrote the paper. The most beneficial action in the whole procedure is the explosion of the carbonic acid gas. I wish I could put this idea in more impressive words, but I believe that it is the explosion of the carbonic gas that cleans out the canals and carries the tissues with it.

Dr. SIMPSON. Is that explosion ever directed back toward the apex?

Dr. CALLAHAN. No. This has been tried by the experiment of placing a tooth in a cork, and the cork in a bottle filled with water; after the explosion there will not be a bubble in the water, showing that the explosion was not directed toward the apex. The action of the sodium and potassium can readily be demonstrated by experiment. If you extract a pulp with a broach, place it on a glass slab, and apply a small portion of the sodium and potassium to the end of the pulp, you will see the sodium and potassium eat it up, so to speak. You will be astonished how quickly that tissue will be destroyed, which proves the action of the sodium and potassium in the pulp-canal.

As to the formula, I have refrained from putting chemical formulæ in any paper written on this subject, as I do not care to pose as a chemical expert. I know a little chemistry, but I have not made any attempt to discuss this subject from the chemical standpoint. I think the formulæ communicated to me by Dr. D. Stern of Cincinnati in a letter on this subject are of sufficient importance to be included in the record. Dr. Stern writes as follows:

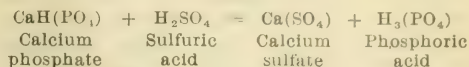
I should like to say a few words in regard to the chemical changes which take place as a result of the 40 per cent. sulfuric acid treatment. Analyses have shown that dentin, on an average, contains 77 per cent. and cement 67 per cent. of inorganic matter. The organic matter in these analyses has been removed by combustion, and the remaining ash has been found to have the following constituents:

	Ash.	Calcium phosphate.	Magnesium phosphate.	Calcium carb.
	Per cent.	Per cent.	Per cent.	Per cent.
Dentin . .	76.8	70.3	4.3	2.2
Cement . .	67.1	60.7	1.2	2.9
Enamel . .	96.9	90.5	traces	2.2

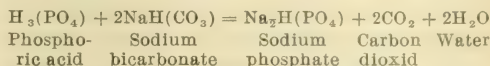
I have given the figures for enamel, although it is not under consideration while introducing H_2SO_4 into the pulp-chamber.

It is not probable that any serious results will follow after the organic matter has been

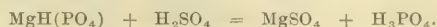
destroyed by the acid, neutralized by an alkaline chemical, and washed out thoroughly. Some of the calcium phosphate might be converted into the calcium sulfate (insoluble in water), which in its desiccated state is plaster of Paris. Chemically stated the reactions are as follows:



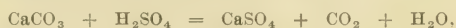
The phosphoric acid produced is neutralized by sodium bicarbonate:



The sodium phosphate is soluble in water and the carbon dioxid gas is violently liberated, and forces all small particles of solid matter out of the pulp-chamber. A very small percentage of the magnesium phosphate may be converted into magnesium sulfate, but the quantity is too small to have any significance:



The phosphoric acid which is formed is also neutralized by the sodium bicarbonate. The calcium carbonate is converted into the insoluble calcium sulfate, as follows:



with the liberation of CO_2 .

The formation of insoluble salts prevents any excess of sulfuric acid entering into the tubuli and doing any damage whatever, and any trace of the acid going through the apical foramen will probably do more good than harm in destroying diseased tissue and perhaps starting a process of granulation to build up healthy tissue of repair. I frequently use aromatic sulfuric acid to accelerate the healing process after having treated an alveolar abscess, and I think that the cure is sometimes hastened by its application. This is to demonstrate that sulfuric acid, judiciously applied, may be as efficacious in assisting in building up as it is in tearing down.

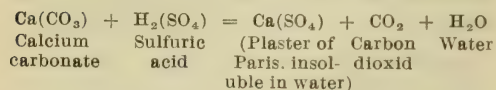
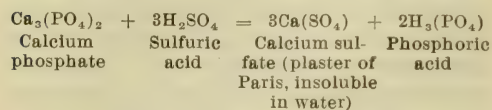
I am particularly interested in this part of the paper, for the reactions can be shown by chemical equations, which are absolutely controlled by immutable laws of nature, and I should be glad to discuss this part of the paper, could I be at the meeting.

[At the request of Dr. Callahan we add Dr. Stern's reply to the question in

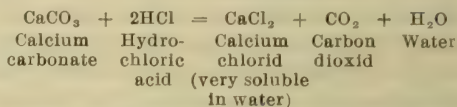
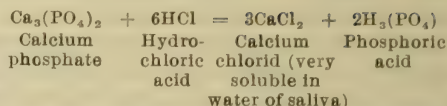
regard to the use of hydrochloric acid in place of sulfuric acid.—ED.]

Referring to Dr. Smith's suggestion in discussing your paper, as to the use of hydrochloric acid in place of sulfuric acid, there should be no doubt in giving the latter the preference. Hydrochloric acid attacks organic matter slowly, and acts violently upon calcium salts. It is most liable to enlarge the opening at the apices of the roots, and also rapidly transform the calcium phosphate and calcium carbonate of the tooth structure into calcium chlorid, which is extremely soluble in water and is used by chemists for desiccating purposes.

The following are the chemical changes that take place:



If HCl is used:



These formulas speak for themselves, and show how much sulfuric acid should be given the preference over hydrochloric acid. In my humble opinion it is only justifiable to use hydrochloric acid for heroic treatment when the tooth fails to respond to the use of sulfuric acid.

At this point Dr. Joseph Head, Philadelphia, Pa., was granted the privilege of the floor for a few minutes to speak on "tartar solvent."

Section II was then declared adjourned by the chairman, Dr. Ebersole.

(To be continued.)

PENNSYLVANIA STATE DENTAL SOCIETY.

Forty-first Annual Meeting.

TUESDAY—Morning Session.

THE forty-first annual meeting of the Pennsylvania State Dental Society was held in the assembly room of the Schenley Hotel, Pittsburg, Pa., June 29, 30, and July 1, 1909.

The first session was called to order on Tuesday, June 29th, at 10 A.M., by the president, Dr. C. B. Bratt, Pittsburg, Pa.

The meeting was opened with prayer by the Rev. Wallace Thorp, Pittsburg.

The Rev. S. B. McCORMICK, chancellor of the University of Pittsburg, deliv-

ered the following address of welcome to the society:

Mr. President and members of the Pennsylvania State Dental Society,— In behalf of the city of Pittsburg and of the University of Pittsburg, it affords me the very greatest pleasure to extend to you this morning a brief word of welcome to our beautiful city. I have often met in this room in the past bodies of different kinds, and yet I never saw it more attractively fitted up, never saw it more suited to the particular occasion than it is this morning. I congratulate you that in this time of intense heat and

humidity you have so pleasant a room in which to carry on your deliberations.

I am glad that you have accepted our invitation to come to our very beautiful city of Pittsburg, and to this particular part of this very beautiful city. I have used these words advisedly, because while I know that many people in the world are altogether familiar with the importance of our city along manufacturing, industrial, commercial, and banking lines, and are willing to pay tribute to her supremacy in such things, yet comparatively few strangers are familiar with the fact that we have in Pittsburg one of the most beautiful cities in the country, and sometimes I think, as I look out over the hilltops, drive along its streets and through its parks, which are themselves exquisite in their beauty, that perhaps there is no other city in our country more worthy of the name of beautiful than this city.

Immediately in front of you there is being erected an athletic park which I am told is not only the finest in this country, but the finest in the entire world, and while I wish no interruption in your proceedings, which are themselves vitally important, I hope that inasmuch as we have arranged the opening of this park in honor of this meeting, that some of you will venture to slip away tomorrow afternoon and observe the operation whereby Pittsburg takes the scalp of Chicago.

You will certainly during your visit here in Pittsburg turn into the beautiful Carnegie Institute building, a building that is not only costly in money but also in the things which it possesses and exhibits. Unfortunately, after tomorrow the annual exhibition of paintings will close, but I trust that it will be possible for you to take advantage today and tomorrow of the opportunity that is still yours to see the splendid paintings which have been for some weeks upon exhibition, and to go through that magnificent building, of which the city of Pittsburg is properly proud. I trust also that it will be yours to pass on into the buildings beyond the Institute building and see something of the splendid Technical

School, and also out into the park beyond, which will abundantly repay you for your visit. I also hope that you will, if time permits, climb up on the hill to Schenley Heights, the site of the new University of Pittsburg, and look down upon this scene in the midst of which you are gathered this morning, thus gaining some comprehension of what this spot is now and is to become in the years which are to follow. The university has only recently come into possession of these forty-three acres of ground on the hillside back of us. There you will observe two buildings almost completed. Others will follow, and when this society is invited to meet here again, perhaps that meeting will be in close connection with the new home of the dental college of our own university, which we trust at that time will be erected upon this new and splendid site.

From that view you will not only see the buildings already referred to, but also the Memorial Building, which is now nearing completion, the University Club, which is just across the street, and the site of the new Athletic Club, ground for which was broken on Saturday last, the many churches in the immediate neighborhood only a little distant, and as you look from that viewpoint down upon this spot, through the park, along the streets and out into the eastern part of the city, I feel that you will agree with me that you have come not only to a city of manufactures, the famous Smoky City, but that you have come for your meeting to a city the most beautiful that you have ever seen.

This is one reason why it gives me pleasure this morning to extend to you a most cordial and hearty welcome. There are, however, gentlemen of the society, other reasons even more important, and among them this: From my slight acquaintance with your profession I can see evidences that the members of the professional world are beginning more fully than ever before to realize the importance and benefit of the work of the profession which you have chosen for yourselves. It seems to me that not only in the higher educational qualifications which you are

now demanding, and upon which you are to insist still further, but also in the character of the work that is done in all dental colleges, in the character of the men who follow the profession, and in the character of the work which is done after these men leave their institutions of learning, the profession of dentistry is coming to occupy a higher and higher place. However ignorant I myself may be as to the technical part of your work, I am rejoiced to know how rapidly the dental profession is coming into touch with the medical profession, and how closely these two professions are related in their ideals of education as well as in the professional skill which is required in both. It seems to me that perhaps there is no work more vital to the well-being of the country than that of the medical profession, whose members give themselves unreservedly to the public welfare in securing the elimination, so far as possible, of the evils that afflict individuals of society; and as I am watching the development of the medical profession, I also observe that the same is true of your profession—that dentists are realizing more and more the necessity of thorough preparation, of complete understanding of the human body, and the relation of this work which you are engaged in to human health and happiness. More and more you are giving yourselves to the alleviation of the pains and ills of humankind, and are doing it with exactly the same purpose as inspires the minister and the physician—that of doing good unto the children of men. It is because I see this, not only in our own city, but in other places all over the land, that it affords me very great pleasure to bid you welcome this morning to the city of Pittsburg. I rejoice with you, gentlemen of the Pennsylvania State Dental Society, in the splendid progress that you have made in the higher conceptions that the individuals have of this noble profession, and in the determination—a determination obvious in such gatherings as this—to continue to advance until your profession will be placed, not only in your own minds but in the minds of the public, in the high place to

which it is entitled; for it is certainly true that upon you depends much of the real happiness and health of the community. Therefore, gentlemen, I bid you welcome to our city and wish for you throughout these days everything that you have hoped for. I trust that the meeting here will be productive of much good, enlargement of understanding and enlargement of ideality, and that all of you will be able to look back upon this meeting as the best ever known in the forty-one years of your history. [Applause.]

Dr. I. N. BROOMELL, Philadelphia, responded to the address of welcome as follows:

Mr. Chairman, ladies and gentlemen,—About half an hour ago the committee came to me asking if I would respond to this address of welcome, and I told them I would either do so or secure a substitute. I mentioned this fact to a friend, and he said, "For Heaven's sake get the substitute!" I was unable to do this and therefore I shall make an effort to say a few words.

Just why I have been selected to respond to this address I do not know, unless it is perhaps for the fact that I am rapidly becoming one of the older practitioners. I have been, so to speak, placed upon the shelf, and I suppose the committee thought it would be a kind way to let me down.

This is not the first time that the Pennsylvania Society has had the pleasure of meeting in this city. The very fact that only two years ago we met in this very same hotel is evidence enough that we enjoyed ourselves and were well pleased with the treatment received at that time. Most of us are familiar with the wonders of this great city. We know of its millionaires, of its manufactures, of its steel works, and of its "fifty-seven varieties," and I assure you that I am only voicing the sentiment of every member present when I say that we accept your kind welcome, and shall do all that we can to enjoy what you have so kindly placed at our disposal.

The vice-president, Dr. W. D. De Long, was called to the chair, and the

president, Dr. C. B. BRATT, Pittsburg, read his annual address, as follows :

PRESIDENT'S ADDRESS.

Mr. Chairman, members and friends of the Pennsylvania State Dental Society,—I shall not attempt to burden you with a history of dentistry. Should anyone be desirous of enlightenment on this subject, I respectfully refer you to late publications. It is unnecessary to inform you of the progress which dentistry has made during the past year, presuming that you have been doing your duty by reading the dental literature of the day. Now is the time when the dental profession must awaken to the fact that there are things to be done, and these things can just as well be accomplished now as in the future. We as a profession have needs, but before we can get what we need we must know definitely what we want.

To be brief, I will refer first to

ORGANIZATION.

As we hope during this meeting to complete our plan of reorganization, I shall not offer any comments on it further than to congratulate your committee on the work which they have done, and the success with which they have met. They will make a report later, and I do not wish to detract from it by telling you in advance what they have accomplished. However, organization is what I want to call to your attention.

Now that we are about to turn over a new leaf, let us organize not only for the purpose of getting greater benefits from original papers and clinics on dental subjects, but in order to come into all the rights due us professionally, politically, and commercially. We are living in an age of progress, and represent in this state alone over three thousand ethical dentists, men above the average in intellect and influence. Why should not the legislature of this state recognize us if we want a new law or an amendment to the old one? Why should we not have members of the dental profession in the

legislature of the state? We should, we could, and I believe it would be for our mutual benefit.

We must establish a permanent organization committee to look after the organization, and keep it organized after we carry out the present plan of reorganization. The membership of this committee should not be changed more than once in five years. They should lay out their plan of work, and then be given time to carry it into effect. The experience and acquaintanceship with the detail work of this character cannot be acquired and put into effect in one year, or two. Further, it is no incentive for a man to try to acquire such knowledge of a committee's work if he is not certain of being in office more than one or two years to perfect his plans.

Our aim should not only be to become better dentists ourselves, but to endeavor to make better dentists of all the three thousand six hundred practitioners in this state. This organization committee can accomplish more toward this by bringing nearly all of these within the influence of this society than can be accomplished in any other way. For when we are bettering our fellow practitioners we are furthering and advancing our profession.

We must cast aside politics, prejudice, and sentiment in much of our work, if we wish to get results. The idea that the good officers and committees should be liable to change every year for any of the above reasons is all wrong. These things should be made a business proposition just as well as the offices of any successful business corporation. And if, as is said, we "profit by others' experience," then let us follow the experience of successful institutions and elect men to office with the expectation of succeeding themselves so long as they perform their duties satisfactorily. An organization committee, if kept in continuous service for several years, would become so familiar with the work that they would know the status of every man practicing in the state.

I believe we have need also for a standing committee to be called the Progress

or Investigating Committee, or by some name that will designate its purpose. It should be the duty of this committee to be ever ready to hear suggestions referred to it either from the President's address or from a member who may bring them before the society. We should not expect a committee appointed by the chair, after retiring for a few minutes, during a busy and interesting session, to be capable of reporting on an address or some important suggestion over which the author may have spent months of investigation. The work of a committee of this kind, if properly conducted, would result in much good. They should have an opportunity to hear the reasons given by the person suggesting them, and then have time to investigate.

Committees appointed for purposes of this kind should not be, as they have been in the past, appointed by the chair, and expected to make a specific report on a matter at the same meeting, but should be given ample time to investigate and report, even though it be at a subsequent meeting.

A DENTAL OFFICE INSPECTOR.

If this can be accomplished, which would have to be through legislation, we can do more to purify the profession and the dental offices than we could in any other way. What I mean by a dental office inspector is one appointed by law to personally inspect dental offices for the protection and safety of the public, to see that those in charge are legally qualified to conduct an office; to ascertain who, if anybody, is employed in said office; to examine his qualifications or credentials, the sanitary condition of the office, including the necessary sterilizing appliances and the condition of the instruments used. This is no dream, but a reality. I have made inquiry and have been informed by more than one supply agent who has occasion to visit all kinds of offices that the condition in some of these is frightful, and that if an office of the kind proposed could be created, it would prove of great value. I have also been told of offices where the forceps and other

instruments are not even wiped after they have been used. You can also see how our Committee on Enforcement of the Dental Law could be dispensed with. While this committee has done some good work in the past, it has not accomplished during the last two years nearly as much as we had expected under our present law. However, this plan would remove the odium which may attend the committee in cases of prosecution.

Even the game laws are more religiously enforced than our dental laws. The game-warden has prosecuted persons for catching or destroying fish, and will not even allow them to be taken out of season for an aquarium. Yet we allow and even license people to destroy teeth and put them in aquariums minus the water. Use this comparison. Think of it!—the teeth, those important organs of humanity, receiving less legal protection than the fishes and wild animals.

We should also see to it that no rooms are rented to people who violate the law, and that the landlords are held just as liable as they would be for renting rooms for other illegal purposes, and that the dealers in dental supplies who sell to unlicensed persons are just as liable as the liquor dealer, or druggist, who sells to persons contrary to law.

All the laws pertaining to dentistry should be enforced, and the profession should see that they are enforced, and those persons representing us on these committees, and others intrusted with the enforcement and fulfilment of the laws, should in turn have not only the sympathy, but the active and earnest support of every honest dentist.

Under this office or section might come also the inspection of teeth in the public schools. It has been shown by late statistics that only about fifteen per cent. of the children in our public schools are not in need of the services of a dentist. This is appalling, and the superintendent of public instruction in this state has told me that something should be done to relieve this terrible condition. Even the teeth of our dumb animals are cared for when they are known to need it.

A single decayed tooth in a horse will

render it physically unfit for service, and so fractious and dangerous that it cannot be used. Then why expect a child of man, made in the image of God, to endure such conditions, and at the same time be subservient to the requirements of a public school? This is no fad, neither is it a selfish motive of the dentist. If the children in our public schools were compelled to put upon their teeth the exercise that is otherwise required of them, eighty-five per cent. would fail!

I believe the profession should do more toward educating the public in the care of the teeth; and not only that, but when misleading announcements and advertisements are made in our public press, the profession should, through the press, correct them. Business is being done more and more every year by advertising, and why should the people be blamed for patronizing an advertising establishment if the advertisement seems plausible and the public is not warned? It is unreasonable to expect this, for I have known many dentists within the last year to be just as much interested as the public to know what kind of dentistry a certain advertised brand was, and the public should be warned just as much against harmful advertisements as against the dangerous microbes we hear so much about.

A DENTAL SECRETARY.

From my experience during the past year and my several years' connection with the examining board, it seems to me that it would be well to consider the advisability of creating an office of dental secretary. This might be done independently of any new act or amendment to the present law, and would require the incumbent to devote his entire time to it. The remuneration should be such that we could secure a competent man for the situation.

Under our new organization this work will necessarily require more and probably all of a secretary's time. His office should be in Harrisburg, and he should be elected for his adaptability to his duties. He could be secretary of the State Society, be on the examining board and

secretary thereof, and also secretary of or to the Dental Council. With the present remuneration connected with these offices and with some increase, we could secure a man to take charge. In these positions he would be familiar with all the detail data of the various dental interests in the state. These are now often neglected or forgotten on account of the many offices, or the too frequent changes occurring.

IS DENTISTRY A SPECIALTY OF MEDICINE?

"Is dentistry a specialty of medicine?" or, "We are a specialty of medicine"; or, "We are a part of the great healing art"; or, "If dentistry is a specialty of medicine, as we believe it to be," or "as we think we are," or "as it is acknowledged we are," or some other such phrase which leaves it questionable whether we are a specialty of medicine, is found in almost every dental journal that we take up.

We should settle this question—and I believe we are capable of doing it—or forever hold our peace. To settle this question and at the same time elevate dentistry, which is even now becoming more important than general medicine or any of its allied or acknowledged specialties, the dentist should have the M.D. degree, and with such knowledge and influence as this degree would bring, there would soon be no question as to which branch of the healing art is really the greatest.

Modern medicine has above all two chief aims, and so should dentistry, namely, the prevention of disease and the recognition of its earlier signs. We need a more intimate knowledge of medicine in order to fulfil these chief aims, and to intelligently try to prevent lesions of the oral cavity and recognize and treat them in their earliest stages.

Preventive dentistry is becoming more nearly an exact science all the time, but its possibilities have yet to be realized.

If the average dentist possessed the confidence and ability to successfully administer anesthetics, dentistry would soon become really painless, and this word "painless" would not have to be

dedicated, as it is now, to the strictly "advertising shops."

We should not have then to send our cases for oral surgical operations to hospitals to be operated on by the M.D., but would have our own ward in every hospital in the state. And why should we not?—when it is claimed by one of the most scientific men of the day, who is not a dentist, that the proper care of the mouth and its proper use in preparing foods for the rest of the alimentary canal will entirely eliminate the need of the M.D. for that important part of the body, and that the few other ailments that could possibly arise from other causes would require but a very small number of medical men. We know of one or two ethical men who successfully preach and practice humanitarian dentistry, and if they can accomplish this, why can we not all do it? I believe we can, but not until we put dentistry on a higher plane than merely filling teeth to prevent further trouble and pain. The teeth should be treated and filled painlessly. We have medicaments, in fact so many of them that the ordinary dentist has not become familiar with their use, but if we had a more comprehensive medical education we should know why and when each medicament would be successful.

If we cannot have this, then let us give up our hold on the medical profession, and start out with a special set of dental text-books. These could be compiled by authors and committees of the Faculties Association, and all superfluous or disputed matter should be eliminated. As it is now, dental students in some of the schools are taught according to one of the several books published on the same subject, and in some subjects the student is compelled to go through a book containing one to two thousand pages in order to read one or two hundred pages on the subject which he wishes to study. If an author writes a good book which contains a few items that other writers may take exception to, then let them get together and settle their dispute, so that the student may have something definite upon which to work and will not be ham-

pered by enmities arising from sectional differences and jealousies.

I would suggest that some books—such as a certain dictionary of which a number of new editions have been published during the last twenty years with scarcely any change, especially in regard to the recent nomenclature—should be excluded from the list of text-books, and that publishers who insist upon keeping old books alive in this manner just for gain's sake should be censured. By a uniform set of dental text-books we should obtain greater uniformity in dental education. I believe it would be well if the curriculum in our dental colleges were copied after that in use in our public schools, where the books and grades are specified, and the teachings in the various grades are carried out alike to the very day in all the schools, so that a child leaving one school one day can enter another one in a distant part of the city and go right on. Students when entering our dental schools should be given to understand that they will be kept in the freshman or junior class until they are thoroughly proficient to proceed, and this rule should be strictly enforced. This would give them an opportunity, if they are not adapted for the work, to discontinue, unless they expect to remain in college several years.

But this cannot be accomplished unless we have a special and uniform set of text-books, and unless all the grades are laid out so that a student may know just what is expected of him every day of the year. This will also bring us nearer to a uniform educational basis for dental reciprocity.

RECIPROCITY.

So much has been said on this most important subject that there is scarcely anything left to mention, but although the profession wishes it, owing to the lack of uniformity in the laws governing dentistry in different states and to the selfish spirit predominating in a few states among a few men in control, reciprocity has not been obtained yet. In one state the cry is, "All come up to

us," but they do not move down, or, more properly speaking, will not change enough to get on an equitable basis. It must all be on their basis. Three or four other states make reciprocity difficult and entrance requirements severe. This may be for selfish motives, in order to keep out others so that they might reap all the benefits.

I believe if the National Association would take this matter up, appoint a committee, and instruct them to secure reciprocity between all the states, and if each state society would appoint a similar committee, and would also require of the examining boards that this subject be given more serious attention in the National Association of Dental Examiners, reciprocity could be accomplished. But by all means the persons intrusted with this work should be given to understand that they must do something.

PYORRHEA ALVEOLARIS.

We still have pyorrhea alveolaris with us, and in spite of the long-continued investigations of our most eminent men we are still told by some that its etiology is not local but systemic, and by others that it is not systemic but local, and by others that it is both local and systemic. In the meantime, however, the patients are drugged within and scraped and drugged without. Would it not be better to acknowledge that its causes are either one or both, and let the rest of us get to work intelligently instead of being kept back by investigators who are too obstinate to acknowledge that another's opinion is right? I believe that as much harm is being done by this obstinacy on the part of the profession as by the disease itself. In this connection I might also refer to sectional feeling. If the East were willing to acknowledge that there are capable men and good methods in the West, and if the West would do the same in regard to the East, then a marked advance in our profession would be made.

HONORARY MEMBERS.

I do not believe that we should make anyone an honorary member unless he

has been a regular member of this society, and has made valuable contributions to the science or art of dentistry, or has rendered important service to the profession. There is no reason why we cannot honor such a man by placing him on an honorary roll and exempting him from dues; but we should not, as is customary, consider him ineligible to all the rights and privileges of active membership, as though he were incapacitated. I would recommend that at the proper time this part of our by-laws be made explicit, and that this honor carry with it all the rights of active membership.

Dr. FICKES moved that a committee be appointed to consider the President's address and report on the same at a later meeting.

The motion was carried, the chair appointing the following committee: O. L. Hertig, J. C. Salvas, G. S. Schlegel.

The President resumed the chair, and after the transaction of some routine business,

The Committee on Oral Hygiene and Public School Dental Education, through Dr. G. S. SCHLEGEL, presented the following report:

REPORT OF COMMITTEE ON ORAL HYGIENE AND PUBLIC SCHOOL DENTAL EDUCATION.

While the activities of this committee have been somewhat meager, some progress has been made. We wish to quote from a letter sent to each member of the committee on November 25, 1908:

" . . . We are, therefore, very much in the dark as to an outline of action; but as the work of this committee is of so vital importance, it behooves us to at least establish a workable basis that may act as a guide for subsequent committees, accomplishing as much additional work as possible.

"From a geographical standpoint the present committee is in position to do most excellent work, for the various sections of the state are represented.

"The main work of this committee must, of necessity, be conducted through our public schools, and in order to work in the public schools we must have the co-operation of the teachers.

"The plan which seems feasible is to inter-

rogate, preferably by letter, each county superintendent of our public schools and each principal of our normal schools, with the object of ascertaining their attitude toward any move which has for its object the dissemination of information respecting the proper care of the teeth by our school children; this to be followed, where indicated, by an expression of willingness on the part of the profession to supply through the committee capable dentists to impart scientific knowledge on prophylaxis and allied subjects.

"Acting on the latter part of Dr. Donnegan's resolution, adopted by the State Society—'Resolved, That the secretary communicate with our local societies, requesting them to appoint committees on oral hygiene, and that the Committee on Oral Hygiene of this society carry on their work in conjunction with them'—I would suggest that each member of the state committee confer with the oral hygiene committee or committees of the local society or societies in his district, stimulating them to action, working with them, and getting a detailed report of their work; these reports to be sent to your chairman to be used as the foundation of the report of the Committee on Oral Hygiene and Public School Dental Education of the State Society.

"I would suggest that Dr. Fickes take care of the western part of the state, Dr. Sprout of the central part, Dr. Fordham of the northeastern part, and Dr. Schlegel of the southeastern part, each member working with the committees of the local societies in his territory, the local committees working through the public schools and charitable institutions throughout the state.

"I shall appreciate any suggestions you may care to make, any work you do. The work of this committee has been too long neglected, and I sincerely trust the present committee will work with a vim, and accomplish that of which I know it to be capable. Do not confine your efforts to your immediate district, or to the confines of this outline, but work.

"Kindly let me have, from time to time, reports from your section, that we may keep in touch with the work and assist one another."

Dr. Schlegel, in replying (April 14, 1909) to the above, says in part:

"The committee . . . was appointed by the president of our local society at the December meeting. . . . This committee held a meeting in conjunction with the Free Dental Dispensary Committee of the Reading

Dental Society. . . . We arrived at the following conclusions:

"That it is not so important that the details of the teeth be taught in the physiology classes held in the public schools. I made a test of ten intelligent patients taken without discrimination from my own practice. This showed conclusively that all that had been studied in regard to the teeth, whether it was right or wrong, was almost wholly forgotten. However, we do not believe that anything wrong should be taught. We recommend that some method be found to correct such faults in our text-books.

"We also find that the report of the special Committee on Oral Hygiene of the National Dental Association, which is issued in pamphlet form and sold at fifty cents per hundred, is about all that could be desired in the form of a simple compendium or catechism. The vital question is to get these pamphlets before the scholars in the public schools, and also to enlist the co-operation of the school authorities and teachers, and to have the pupils instructed by them.

"The teachers of our public schools will hold their next institute Saturday, May 22, 1909. It is our purpose at that meeting to have one of our high-school teachers make an announcement that our Free Dental Dispensary, which is about to open, is particularly established for the poor children of our schools. We will also have him tell the teachers how they can get dental attention for deserving pupils. At the same time we shall give to each teacher one of the little pamphlets on Oral Hygiene issued by the National Dental Association, and most important of all, shall announce that E. C. Kirk, D.D.S., Sc.D., will deliver an illustrated lecture on oral hygiene at the next institute in September.

"We expect to start our dispensary as soon as possible, probably about the middle of May. Inclosed find a resolution which was signed by twenty-five resident members of the Reading Dental Society:

'READING, PA., April 1, 1909.

'Whereas, We the undersigned have agreed to contribute not less than four dollars toward a fund to be used for the equipment of a Free Dental Dispensary; therefore be it

'RESOLVED, That we, the undersigned, promote the interest of this Free Dental Dispensary, in Reading, Pa., by giving our services gratis to all persons duly qualified who report at the dispensary for any service provided for in the rules of the dispensary, the frequency and order of attendance of each

dentist to be determined by the Reading Dental Society. This obligation shall remain in force as long as any of us, the undersigned, are in legitimate and active practice in Reading, Pa.'

"It was necessary for the members of the society to show their faith in this matter by contributing at least one hundred dollars, which sum is to be used as a guarantee by a charitably inclined gentleman, who volunteers to raise the necessary funds for a full equipment and maintenance for one year.

"We wish to create an immediate demand for services at the Dental Dispensary. We can do this through the school teachers; they teach the poor as well as the rich."

From Dr. Fickes' paper, the following information was secured:

"Dr. C. S. VAN HORN, *Chairman of the Committee on Oral Hygiene and Public School Dental Education, Pennsylvania State Dental Society, Bloomsburg, Pa.*

"Dear Doctor,—As a member of your committee I wish to report as follows:

"The text-books used in several schools in western Pennsylvania were examined, and the subject of dentistry and oral hygiene was found to have been treated in a manner which certainly needs correction. Owing to the uncertainty as to the school control because of pending legislation, it was considered inadvisable to attempt to have changes made in the text-books or to make regular examinations of the school children's teeth.

"During the year, with the help of Drs. H. E. Friesell, F. C. Friesell, J. F. Biddle, J. H. Crawford, O. M. Sorber, and Geo. Fisher, the teeth of children in several free institutions and one public school room were examined. The teeth of almost all those examined needed attention. Some were sent to the infirmary of the Pittsburg Dental College, and others who were either too young or infirm to go as far as the college were attended to by the gentlemen named. As a matter of course the services were given without fees.

"Dr. Biddle read a paper before the Odontological Society of Western Pennsylvania at the March meeting, in which he pointed out the great need of dental education and examination in our public schools.

"Drs. Biddle and Fisher examined the teeth of twenty public school children, and nineteen out of the twenty needed attention; fifty per cent. of them had lost from one to five days of the term of school because of tooth-ache; five of them had deciduous teeth which should have been extracted from one to three

years previously; only six of the twenty had ever used a tooth-brush; every tooth had been extracted from the right upper jaw of one child, including the permanent canine and first molar, and three children had active abscesses.

"The teeth and mouths of the children in the free institutions were found to be in a better condition than were those of the children examined in the public school, although, probably owing to lack of funds, much work remained to be done.

"Most of the children used tooth-brushes, but their mouths were not in a hygienic condition. The children in two orphan homes and a home for crippled children were examined, and such attention given to them as was possible. In one institution one hundred and eighty children, from five to eighteen years of age, were examined for caries and other pathological conditions needing immediate attention, and charts were filled out for seventy of these which showed the following conditions:

"Twenty were mouth-breathers, and most of these showed other indications of nasal obstruction and the results arising therefrom; fourteen of these twenty were above medium, three medium, and three below medium in mentality; eight showed fairly good occlusion, three medium and nine marked malocclusion; of the twenty, nine had good health generally, four medium, and seven poor health; twelve were of average height for their age, four were above, and four below the average.

"Of the seventy, the mouths of four had received excellent care, three were in bad condition, and the others had received some care, but not sufficient to keep their mouths in good condition. Only one had perfect teeth. All were required to use the tooth-brush once a day. There were no hare-lips or cleft palates and but one V-shaped arch. Nine had pulpitis, one pericementitis, two acute abscesses, and seventeen chronic abscesses. Forty-five had salivary calculus, one serumal calculus, twenty-one gingivitis, three pyorrhea, and ten green stain. Four hundred and ninety-eight carious teeth needed filling and there were ninety-four deciduous and twenty-four permanent teeth to be extracted. Three of the children had atrophied teeth. Many of the children had already been attended to, and others will receive attention soon.

"Respectfully submitted,

"W. L. FICKES."

Investigations, as far as reported, would seem to indicate that our principal educators are in accord with the oral hygiene move-

ment, and while these investigations have been reported from only a few counties, we are led to infer that further investigation would but tend to corroborate the assumption that the dissemination of information on oral hygiene would be welcomed in our public schools.

We would recommend, as probably the most important step, the formulating of plans which would be instrumental in bringing the public-school teachers in closer touch with the work that is being done by the dental profession in their effort to conserve the teeth of our children. There must be a bond of sympathy between the teachers and the profession; each body must recognize its dependence upon the other, and they must work in unison and harmony, if our children are to receive the benefits which are their due, and must be in position to guide the children in properly caring for the organs of mastication and cognate tissues.

Free dental dispensaries are multiplying, though slowly, and while they are indicative of a most noble cause and are in position to do most excellent work, it cannot be anticipated—as pointed out by Dr. Schlegel in his report—that they will confer their beneficence to the full extent until their efforts are approved and appreciated by the laity.

In concluding this report we would recommend the reports of the committees of 1906 and 1907, calling special attention to the indorsement and encouragement of "periodic lectures in the public schools by competent practitioners," and "The committee would suggest that it be given power to bring this matter personally before the Commissioner of Health."

Respectfully submitted,

C. S. VAN HORN,
W. L. FICKES,
G. S. SCHLEGEL,
W. H. FORDHAM,
B. B. SPROUT,

Committee.

On motion the report was referred to the Council.

The Clinic Committee, Dr. H. E. Friesell chairman, reported that the clinics would be held on Wednesday afternoon at one o'clock, as announced in the program.

Motion made and carried that the report be received.

The next order of business was the reading of the minutes of the last meet-

ing, which on motion was dispensed with as they had appeared in the Proceedings.

Motion was made and carried to adjourn until the afternoon session.

TUESDAY—Afternoon Session.

The meeting was called to order by the president, Dr. Bratt, at two o'clock Tuesday afternoon, June 29th.

The first order of business as announced by the President was the reading of a paper by Dr. W. R. CLACK, Clear Lake, Iowa, entitled, "A Method of Making Gold Fillings Without the Use of Pits, Parallel Grooves, or Undercuts for Retention."

[This paper is printed at page 1271 of the present issue of the Cosmos.]

Discussion.

Dr. A. P. LEE, Philadelphia. I should like to thank the essayist for forwarding to me a copy of his paper a few days ago, and to state that I had great pleasure in reading it. I was somewhat handicapped, however, by the lack of diagrams, which of course he could not forward with the paper, and for that reason I shall not be able to discuss the subject as I should like to. He has presented a paper which in a measure is a novelty, at least in the East, for we seem to have fallen behind of late in the number of papers on cavity preparation and gold fillings. Our convention papers have treated subjects related more to general dentistry and pathology, and but little pertaining to these features of operative dentistry has been presented.

The essayist alludes in the early portion of his paper to separation, which of course is one of the fundamental principles for good work in gold operations. He speaks of the different methods of separation, of the waxed tape or ligature, which to my mind is the most preferable, and also of rubber, which I very seldom use. I should not advocate the method suggested of using the excavator blade with the aid of the assistant's weight, if it is more painful than the use of rubber. I use rubber only when I must make a separation within twenty-four hours. The

mechanical separator has its place, but great care should be taken to thoroughly fix the bows in order to prevent the edges from impinging upon the gum septum. In using gutta-percha as a separating medium, a great many men have been in the habit of leaving it in place for a considerable length of time, possibly six months. I find that in such cases we often have difficulty to restore correct occlusion, and would therefore sound a note of warning.

Among the instruments used in cavity preparation the essayist first mentions the inverted cone. I have had success with the fissure bur, although I am aware that many men prefer the inverted cone. The cavity form employed by the essayist is very similar to that which I use. The idea of parallel walls is one that I have carried out for some time, because it seems the only mechanically correct form of cavity.

Extension for prevention is of course being generally followed by most operators. In relation to extension for protection, I feel that this feature of cavity form has not been practiced enough. I have been hoping for the last year or two that the preparation of cavities for cast gold inlays will bring about a great improvement in this direction. If a cavity is to be correctly formed for a cast gold inlay, extension for protection must be taken into consideration, for the reason that weak overhanging walls in occlusal surfaces must be removed to allow the withdrawal of the wax model.

Dr. Clack has said that he does not pack gold according to some of Dr. Black's methods, but uses unannealed gold foil on the lingual and buccal margins. As he has candidly admitted that it is not possible for him to pack annealed gold along these margins with good results, I feel justified in saying that I am not able to pack gold according to Dr. Clack's method. With a matrix applied to the cavity illustrated in his Fig. 5, the operation is rendered much simpler. It is a difficult feat to place an unannealed strip of foil along the buccal and another on the lingual margin, and keep them in place while they are

being wedged. His form of retention over the occlusal surfaces is in my opinion being followed by most men.

I notice that the essayist calls particular attention to the use of gold foil. While he has made no mention of crystal gold in his paper, a warning in regard to this gold can be read between his lines. A great many men are in the habit of placing crystal gold along the margins of cavities on account of the apparent ease with which it is adapted, thinking that they succeed in making good marginal lines, which is, however, a great mistake. There are a few rare cases in which I believe crystal gold to be adaptable, and its use possibly advisable, namely, in the small pits found in approximal surfaces of anterior teeth of a patient who is apparently immune to caries at that period, when one does not wish to greatly extend the margins, and when it is exceedingly difficult to pack gold foil.

I should like to say that in my opinion the manufacturers of gold foil can produce much better pellets than Dr. Clack or I can make. I have tried making pellets, but with little success, possibly because I do not know how.

I wish to congratulate Dr. Clack in one particular. It is decidedly refreshing to us of the East, who have been dubbed by certain westerners as being behind the times, or possibly by more kindly disposed critics as being conservative, to have a man from the West who is a disciple of Dr. Black—whose excellent methods most of us indorse and practice—admit or claim that he has certain methods that he believes are better than those of Dr. Black.

Dr. O. L. HERTIG, Pittsburg. I was very much interested and pleased by Dr. Clack's square cuts, square cavity preparations, and squarely written paper. There are, however, some points in which I cannot agree with him.

In Pittsburg we are so fortunately situated as to be close to the conservatism of the East and not so far from the radicalism of the West, reaping the benefits of both, and we are forming what may be called an ultra-conservative radi-

calism that combines the good points of the two.

I was surprised to hear Dr. Clack say that he could not fill an undercut, and I venture to say that if you look at his pluggers you will see the reason why—they are all straight. In the anterior teeth wedging is not necessary, but from the first molar backward I do not see how anyone can adapt cohesive gold against straight parallel walls without resorting to wedging. The force which it is possible to apply in such a case is out of all proportion to the amount of force required to condense that gold. [Dr. Hertig here illustrated his method of wedging gold.]

I should like to know why all teachers advise the placing of the rubber dam before a cavity is prepared. If we did that in Pittsburg, the Anti-Tuberculosis Society would get after us. You put on the rubber dam, cut into the tooth with the bur, take up the chip-blower, blow out a draft, and then breathe it. How much better it is to prepare the cavity while the patients can expectorate the débris, which affords them a period of rest.

Dr. Clack's paper illustrates an undeniable principle. Architecturally his cavity preparation is correct, but anatomically the square and angular preparation does not altogether agree with the shape of the teeth, the pulp-chamber, and the dentin. The pulp is a minute replica of the external form of the tooth, therefore in placing a square box in a tooth we have to be mindful as to exposure of the pulp, unless we have a deposit of secondary dentin which will allow of a seat of sufficient size to form anchorage for non-cohesive gold. Non-cohesive gold, I admit, can be packed into a small space so as to afford the amount of specific gravity desired, but for the sake of security you must have a large seat. If you use cohesive gold and adapt it properly to place, a seat of one-third that size will be sufficient.

Dr. F. D. GARDINER, Philadelphia. Not having received a copy of the paper in advance, it would be rather unjust for me to attempt to discuss it in detail.

I should like to say, however, that Dr. Hertig has voiced my sentiments very accurately, and I think it most unfortunate that the subject of cavity preparation has been so greatly neglected in the East. From the result of my observation I am quite sure that the reason why Dr. Black's methods have not been generally adopted in the East is because they are not understood. I believe that very few in this section have read Black intelligently; if they had they could not help but agree with him. His is the first and only scientific method of cavity preparation ever brought before the profession. Practically the mere statement of the principle of extension for prevention should carry conviction without any argument. I practiced extension for prevention many years before Dr. Black advocated and named this method, as it seemed to me the only rational procedure and the only way to obtain results.

Dr. A. C. BARCLAY, Pittsburg. Dr. Clack's paper is a commendable one, and so clear and definite that little or nothing can be added. Only the emphasizing of a few points is left for the discussion, and as I am not the first to discuss it, most if not all of these available points have been touched upon.

First of all, emphasis must be placed on the securing of sufficient separation in order to have a proper contact point to protect the interproximal tissues. The most perfect filling is a failure if the soft tissues are not protected from the impact of food. This of course is more frequently the case when amalgam is used. Immediate separation or partial separation by means of gutta-percha or cotton, followed by the Perry general separator, is an excellent method and less painful, because the teeth are lifted apart and held firmly while the gold is being condensed. This mechanical separator is very satisfactory.

The cavity preparation as outlined by Dr. Clack is ideal. I see no reason why anyone should criticize it, except that in the case illustrated in Fig. 5 I should make a slight undercut at the labio-linguo-gingivo-axial angles.

Dr. CLACK. Tell us why?

Dr. BARCLAY. For the reason that I could start the gold more accurately, and if I have access, which I get by separation, I could condense the gold in that point very thoroughly.

There is no other criticism possible, except on the part of the patient, and the resulting permanence and usefulness are reasonable arguments with which to convince the patient of the wisdom of being thorough.

Dr. G. V. BLACK, Chicago, Ill. I am very glad to appear before this association and to say a few words on Dr. Clack's paper, and to find fault, as I usually do whenever I can. I am particularly glad to meet with this association, as I believe I have not had the opportunity heretofore to meet with the Pennsylvania Dental Society.

As to this particular paper, I would not say much in discussing it. Dr. Clack has not gone so far astray that I need to call him back. His cavity preparation is very good. He has perhaps surprised some of you by the fact that he makes no undercuts. I tell my students to make slight undercuts in the linguo-gingivaxial and bucco-gingivaxial angles as convenience points, with which they may do away after they have obtained sufficient experience; but these undercuts are not made for the purpose of retaining the filling, but as a convenience in starting it. A large part of the last twenty years of my operating was done without them, as Dr. Clack has shown you.

As for non-cohesive gold, if it is rolled into cylinders and placed in the gingival portion of the cavity and malleted with the cohesive gold as it is put over it, and if the ends of the laminæ are turned outward, it will never flake out. You must not expose the flat sides of layers of non-cohesive gold to stress or wear. Furthermore, after that gold is malleted, you may put the dynamometer upon it and you will find that it will behave just like cohesive gold, but you must condense it and retain the laminated fold. Now, these are matters of careful experimental work. I would not do this exactly as Dr. Clack has done. I would not lay this along the buccal and lingual walls [illus-

trating], but if I wanted to line these walls with non-cohesive gold I would do it by laying cylinder after cylinder of non-cohesive gold against these walls, immediately covering each partly with cohesive gold, and mallet the two down together. In that way I should accomplish precisely the same result and do it much more easily. Anyone who has tried this will know that such an operation may do very well. There is, however, nothing wrong with Dr. Clack's theory; it is only a question as to the mechanics of getting the gold into position. In fact, this discussion is simply a discussion of the mechanics rather than the philosophy of filling teeth.

As to the use of the rubber dam, there is some truth in what was said about scattering germs by the use of the air-syringe. I do not like to breathe these germs, but a cavity is the rarest place to find tuberculosis germs. You will find them almost anywhere else than in decayed dentin. You might find them on the outer surfaces, but not in the depths of a cavity. I tell my students that the rubber dam is not pleasant for our patients, and that they should keep it on for the shortest time possible as far as is consistent with efficient operating, therefore whenever I can make a part of the preparation of the cavity without the rubber dam as well as I could with the dam, I prefer doing without. I never complete the cavity preparation, however, without the rubber dam, and if from any cause I find it necessary to delay the filling of the cavity until another time, I protect every margin as best I can until the next sitting, and then go over every margin and wall of the cavity with a sharp chisel and make it fresh and clean, and immediately insert my filling. Nothing ever touches my cavity wall after its final finish except the filling material that I put against that wall.

Dr. MORGAN. I should like to ask Dr. Black a question. He made the statement that nothing touches his cavity wall except the filling that he puts against it. It is a common practice among many dentists to medicate the cavity after the preparation is made; though

I have not adopted that practice, I should like to ask whether Dr. Black advocates it, and whether after medicating the cavity he cleans the walls again with his instruments before placing the filling in the cavity?

Dr. BLACK. I have never heard a rational statement as to the object of such medication. Unless I know what I medicate a cavity for, I shall not medicate it, certainly not for the purpose of destroying germs, because you have removed them all mechanically, if you have done your duty. Nor would I medicate it for any other reason. Every liquid that is put into a cavity leaves a residue when it dries out that must be cut away from the cavity. In order to demonstrate this to my students, I took clean lantern-slide cover-glasses, let them touch their tongues to these, and then placed the dried plates in the lantern and showed them the crystallization that had taken place on the plates. You do not always need the lantern to show that; it is visible to the naked eye. The same takes place in a cavity that is medicated, and if an oily substance is used in doing so, it is still worse.

Dr. PORTER. In regard to the cavity shown in Fig. 5, if for certain reasons it be necessary to retain the cavity without a step, you have the two extremes to choose from, either parallel walls or extensive undercuts. In one case the wall is weakened; in the other, if it is at the right-hand corner, the filling remains in place, the stress is at right angles to the anchorage—

Dr. CLACK. Figs. 5 and 6 are cross sections of a bicuspid with the step cut off, and this one [illustrating] is a sectional cut of the gingival seat.

Dr. PORTER. I made the statement that if a step is contra-indicated, the extension of the cavity necessary for retention produces an enormous pressure against the walls, and if the filling is V-shaped, we have a wedge action the power of which is even greater. The happy medium seems to be to make a slight groove, which gives much greater strength to the walls.

I should also like to ask Dr. Black,

how, in case of a young person, he would treat an almost exposed pulp which he would not like to remove.

Dr. BLACK. Cut away the decay from the cavity, whether the pulp becomes exposed or not. If the pulp is exposed, treat it as it should be treated, but never leave any carious dentin in a cavity under any circumstances.

Dr. H. E. FRIESELL, Pittsburg. It is rather taking advantage of both Dr. Black and Dr. Clack to ask so many questions of Dr. Black on Dr. Clack's paper, but I should like Dr. Black to say what he finds to be the first evidence of decay in dentin, also whether in his long and varied experience he has ever found that softened or decalcified dentin left in the bottom of a cavity—left there for fear that if it were removed, the pulp would be exposed—becomes recalcified and protects the pulp, as is taught in some of our text-books, and is still believed by some operators.

Dr. BLACK. I am very willing to be questioned as much as you may think necessary. A number of the questions I will answer tonight in my paper, but the one in regard to carious dentin becoming hardened I will take up now. It seems singular that this attitude should be taken with regard to carious dentin. It is true that it will dry out and shrink, leaving a little opening between the dentin and the filling, and become harder, but its dentinal fibrils are dead all the same. It is also apparently true that the drying which causes the moisture to leave the decaying mass of softened dentin does something else, and I have not adopted my plan of removing every particle of carious dentin without reason. Records and examinations of cases have shown to me that more pulps are lost by leaving decay than by removing it. The evidence is that the material left in the cavity will act as a poison on the pulp under it. From my records I have found that pulps are saved by cutting away that decay. In some cases I have perhaps not fully exposed the pulp, in others I have, but in the long run I have saved the greater number of pulps by removing all decay.

Dr. CLACK (closing the discussion). I never hear Dr. Black speak without being benefited, and I was in hope that more questions would be asked, because he can answer them so much better than I.

There were several points brought out in the discussion of my paper that I wish to speak of in closing. In the first place, there was a misunderstanding with regard to one item in my paper that I will correct first. What you see here [indicating] is a gold filling, not a matrix. Some good may be derived from a matrix, but a member of the Black Club who would use a matrix for making gold fillings would cease to be a member of the club immediately. You do not obtain the right line of stress with your plugger when you use a matrix. I can get a line of stress with the straight plugger that you cannot get with the matrix adjusted. Any condensation that we are able to get with the matrix is secondary condensation, and I much prefer primary condensation. A man who is expert enough to use the matrix and still get condensation at the correct angle against that margin will no doubt make a beautiful filling, but there are limitations to the ability of many of us, and I freely confess to you that I am unable to make margins that will stand stress unless I can condense the gold against the enamel margin from the proper angle.

Another item mentioned in regard to obtaining separation was the changing of the occlusion of the cusps. Whenever you separate teeth you disturb the relation of the upper and lower cusps, but you must be careful to do this gradually, so that the teeth are gradually separated. When you have obtained separation and have finished the operation, you need never fear that the teeth will not come back to proper contact, because you have not destroyed the tendency of the cusps to drive the teeth back into their original positions; but they cannot go all the way back, on account of the contact point. I have seen cases in which ample separation was obtained and the filling made, but the grinding of the cusps had changed the occlusion so much that the

teeth were not brought back to their original normal position. That is why I would be careful in grinding cusps. When the patient comes back (and I ask all patients to come back in a reasonable time, to see if the teeth have the tendency to come back to their normal condition) I examine the occlusion of the cusps, and if I find one pounding I shorten it, because otherwise it may lead to the splitting off of the buccal or lingual cusp. You must be careful, however, not to disturb the force that tends to close up the space.

I have made many preparations for gold fillings at clinics, and I have in mind especially one that I made at the alumni meeting of the Dental Department of the Iowa State University in February of last year, when I said after having finished the preparation that the same cavity might be used without change for a gold inlay. A great many observers shook their heads. I called Dr. Ball, who is an authority on inlay matters in our state, and asked him to make a thorough examination of the cavity with a view to making an inlay. After the examination he said, "Gentlemen, I can remove a model from that cavity without any trouble. There is no undercut, no pit or groove, but I am just a little skeptical as to the possibility of inserting a gold filling there that will not fall out." After I had condensed the unannealed gold in the gingival third of the cavity, I called Dr. Ball and asked him to test it with an instrument and see if he could dislodge those cylinders, and it was impossible to do so by any force that would not tear the cylinders to pieces. I can make a gold filling in any cavity that I consider properly prepared for a gold inlay. There is no necessity for undercuts, except as Dr. Black said, to aid a student until he has sufficient confidence to do without them. I once made undercuts, pits, and grooves, but I gradually made them less and less, until I found that I do not need them at all.

One of the reasons why a great many men have failed to grasp Dr. Black's principles is that they have read his

writings but have not been able to see a demonstration of these principles; and it is very hard to learn anything mechanical from text-books. Men who had opposed this method have dropped all objections when they saw it practically demonstrated.

There are different ways of using the rubber dam. One of the first questions that an applicant for membership in the Black Club is asked is, "Do you always apply the rubber dam in operations upon human teeth?" And the exceptions must be very few, if the applicant gets by Dr. Wedelstaedt. But just as in obtaining separation, there are methods of applying it, some of which are humane and some not. You will find, however, that if you use the rubber dam properly and humanely a great many of your patients will not object to it in the least.

With regard to tuberculosis germs in cavities, I would say that I have been practicing dentistry for over thirty years, and while I have never been able to procure insurance from an old company on account of my family record, I have contracted very little tuberculosis from my patients. The Black Club at Buffalo was criticized very severely in the report of the National Association, because the members do not advocate the use of some lotion to sterilize cavities after preparation. Their reason is that they object to moisture of any kind on the inside or the margins of a cavity after it is prepared. Fig. 127 on page 129, vol. ii, of Dr. Black's new work will explain why this objection is made. One of the main objections that I have to the inlay is that after the cavity is prepared, and before the inlay is placed, soap, vaselin, saliva, and other foreign matter are likely to be introduced into the cavity, and from the lantern slides shown by Dr. Black we learn that these substances leave a film over the cavity surfaces that cannot be removed without renewed planing.

One of the speakers questioned whether we could make gold foil into pellets as well as the manufacturer. I am willing to admit that I cannot do it, but I have an assistant who can, and I know

just exactly how much force to put on each piece to secure uniform condensation and a certain specific gravity.

I was much impressed with the remarks of one of the speakers as to geographical location, and I believe that there is more truth in his remarks than was suggested by the jesting manner in which he spoke of it. I believe that agitation is the best means of bringing out the best results, and I also believe that a certain amount of conservatism is necessary. There are a great many men who take up a new thing and carry it to extremes, and so I believe that you occupy a good territory here in Pittsburg. You are in a position to see the faults of both extremes and to choose the right.

With regard to the feeling of the eastern men toward the western men, I have to say that I have never been more kindly received than by the eastern men, and I have never hesitated, as far as principle and method were concerned, to discuss these subjects with them and to differ with them. I do not wish to differ with any man as a man, but only with his methods. We of the West do not think for one moment that we have any advantage over the eastern men in the manipulation of gold. I frankly admit that I have seen operations made by eastern men that were a delight to the eyes, in regard to beautiful condensation and finish; but when they state that their gold fillings on an average last only from two and a half to three and a half years, the weakness of their methods is exposed, because you can travel throughout Minnesota, Iowa, and Illinois, and find fillings that have been in place from the time when the operators were able to grasp Dr. Black's principle, large restorations that today are absolutely perfect with margins as perfect as they were on the day when they were made—and what more could you wish of them?

Dr. J. G. LANE then presented the report of the Committee on Reorganization, as follows:

REPORT OF THE REORGANIZATION COMMITTEE.

The Reorganization Committee begs leave to submit the following report. The committee as originally appointed by the Council of the State Dental Society had as members Dr. J. G. Lane, chairman, and Drs. H. B. McFadden and J. Clarence Salvas. Dr. P. B. McCullough was afterward appointed to serve on the committee in the place left vacant by Dr. McFadden, who resigned.

The committee began work by preparing indexed lists of the dentists of Pennsylvania by counties, getting the lay of the ground, as it were. A careful investigation of the task before us revealed it as being a mammoth undertaking. In order to facilitate the work, the Reorganization Committee appointed an associate committee early in the autumn to work the western part of the state. This associate committee was composed of Dr. Charles Friesell, chairman, and authority was given him to appoint other members on his committee. Accordingly he appointed Drs. W. H. Fundenberg and H. W. Arthur.

The eastern part of the state is fairly well covered by local societies—there being seventeen or eighteen—except in certain localities wherein the dental population is so small as to make it almost impossible to maintain a local society. A very surprising feature is that two counties in Pennsylvania have only one dentist in each. These are Forest and Cameron counties. And still more surprising is the fact that twenty-eight of Pennsylvania's counties have no State Society members.

The Reorganization Committee has taken the matter up with the officers and members of the local societies, and has attended personally the meetings of quite a number of them, such attendance being arranged for every occasion when it seemed advisable for a member of the committee to be present.

It was thought by some that the time for voting upon new constitutions, etc., was not ripe until the State Society had adopted a code of by-laws that would place that body in readiness to receive local societies as component members. This is not to be construed as being opposition to reorganization measures, but simply that in the minds of some it did not seem to be the proper order of procedure. On their account we have, as far as

actually urging reorganization measures upon them is concerned, allowed the matter to rest until the State Society is in readiness to receive them in component membership. We feel, however, that by having kept the matter so unceasingly before the local societies all the while, the whole field is slowly but surely ripening into the harvest that must follow.

Pursuant with the work of the associate committee, the Odontological Society of Western Pennsylvania adopted a constitution and by-laws of component membership in March. In April the parent committee succeeded in having the Dental Society of Chester and Delaware Counties adopt such constitution and by-laws. Later the associate committee enrolled the Lake Erie Society as a component member of the State Society, and at the last meeting of the council of the Academy of Stomatology of Philadelphia it was resolved that that body was heartily in accord with the reorganization measure as proposed, and that as soon as the details were more fully perfected by the State Society, they would recommend its adoption by the Academy. The Pennsylvania Association of Dental Surgeons passed the same resolutions.

The Reorganization Committee desires to give due recognition to the management of the DENTAL COSMOS for a very considerable amount of typewriting, and other services rendered to the committee.

(Signed). J. G. LANE, *Chairman*,
J. C. SALVAS,
P. B. McCULLOUGH,
Committee.

Dr. H. E. Friesell moved that the report be accepted, and that the society proceed to act on the recommendations of the Committee of Reorganization looking to the reorganization of the society.

Motion carried.

The by-laws and constitution were then taken up section by section, and after some amendments were adopted as a whole.

The meeting then adjourned until the evening session.

(To be continued.)

DENTAL SOCIETY OF THE STATE OF NEW YORK.

Forty-first Annual Meeting.

(Continued from page 1204.)

FRIDAY—*Morning Session.*

(Continued.)

The next order of business was the reading of a paper by Dr. H. E. FRIESELL, Pittsburg, Pa., entitled, "The Interproximal Space: Its Importance and Preservation."

[This paper is printed at page 1245 of the present issue of the Cosmos.]

The discussion of Dr. Friesell's paper was postponed until the afternoon session.

The meeting then adjourned until 2 o'clock.

FRIDAY—*Afternoon Session.*

The meeting was called to order Friday afternoon at 2 o'clock by the president.

The first order of business was the discussion of Dr. Friesell's paper, as follows:

Discussion.

Dr. A. R. STARR, New York city. There are no new theories or methods advanced in the paper, but it simply presents in a clear, concise, and masterful manner the doctrines already preached to us by Dr. Black of Chicago, whom we all admire. There is really, then, very little in this paper which permits of discussion, since we recognize that these principles are in the main perfectly true, and for that reason I shall not take up much of your time. I wish, however, to say a few words on one point brought out in the paper, viz, that in regard to contact points.

I cannot quite agree with Professor Black or with the essayist when he says

that the contact point represents really the contact of two spheres. I recognize the fact that where we have the contact of two surfaces which form arcs of circles, the contact point must necessarily be small. The approximal surfaces of the teeth, however, do not always form perfect arcs of a circle, especially not in the posterior teeth, where there is a flattening in at least one direction. This is practically admitted by Dr. Black in his recent work on Operative Dentistry. If you will consult that work and note Figs. 86 to 91 inclusive, and Fig. 100, in the first volume, you will see diagrams which illustrate the feature of which I am speaking, namely, that between bicuspids and molars there is not the same condition as is in the contact of two perfect spheres, but that there is a flattening in one direction, namely, the faciolingual. You will note that I use the term *facial* instead of buccal, and I trust you will pardon me for doing so, and for explaining why I use it. I am in the habit of using that term in teaching because I think it simplifies matters. Not long ago we dropped the term palatine, and now use the term lingual to describe the inner surfaces of all the teeth or those nearest to the tongue, but most writers still adhere to the method of calling the outer surfaces of the anterior teeth labial, because they are nearest to the lips, and the outer surfaces of the posterior teeth buccal, because they are nearest to the cheeks. Since the lips and cheeks are a part of the face, I see no objection to the use of the term *facial* to describe these outer surfaces, thereby eliminating what I consider a redundancy of terms.

We find in this work of Dr. Black's, in connection with the diagrams mentioned, that he describes and illustrates the tendency of caries to extend superficially on the approximal surfaces of the posterior teeth from facial to lingual, stating that it will extend farther in that direction than it will occluso-gingivally. This I believe is true, because of the fact that we have a flattening of the approximal surfaces facio-lingually. The tendency of caries to spread superficially in the opposite direction is much less, since the contact point, as shown in a vertical section, is much smaller. I think the tissues in the interproximal space receive better protection because of this arrangement than if we had the contact of two spheroidal surfaces meeting at single points. The diagrams, or this model [showing model] will perhaps explain what I refer to better than it can be explained by word of mouth. Take, for instance, the contact between the bicuspids and molars. In this model we have a small contact point near the outer or facial side of the space, thus making the outer or facial embrasure much shorter than the internal or lingual one. In normal occlusion the facial or outer cusps of the posterior lower teeth will occlude in the sulci between the prominences of the upper teeth, and the internal or lingual cusps of the lower teeth will occlude with the lingual surfaces of the upper teeth. There is an overlapping, in other words, which is a salutary condition, since it prevents injury of the soft tissues and gives a better masticating surface. If you have a narrow contact point in the direction from facial to lingual, as in this model, there will be a wide space toward the lingual into which food may be forced, causing injury to this particular surface of the gum tissue in the interproximal space. The injury to that tissue will be still greater in the maxilla, owing to the fact that the lingual cusp of the lower tooth would occlude against this surface and serve to still further force food against the gum in the lingual portion of the interproximal space. I believe the normal condition is to have a slight flattening of

the arcs of the approximal surfaces in a facio-lingual direction to give a better protection to the underlying gum tissue. Understand, however, that I do not mean that this surface is flattened in all directions, but only in this one plane. In the opposite or vertical plane we have a rounding of the arch and a small point of contact, resulting in the contact of narrow edges rather than of flat surfaces. I am sorry that I have not a diagram to still further explain this, but I think you grasp the idea. This is demonstrated in Black's work, where he also shows that caries is more liable to spread upon the approximal surfaces from facial to lingual than from occlusal to gingival, because the contact points, or what he calls the "areas of near approach," are broader in that direction.

The restoring of the original mesio-distal width of the tooth in building out the contour I think a very important point, and one upon which the essayist perhaps did not lay quite enough stress. We have been told that there is a tendency to wearing down of the contact points so as to produce a diminution in the entire length of the mesio-distal diameters of the tooth as age advances. We should then strive to restore the original mesio-distal width of the tooth, or exaggerate it in order to overcome that tendency. If we do not restore the original mesio-distal width of the teeth, we obtain a nearer approach of the approximal surfaces toward their occlusal portion, a shortening of the spaces called the embrasures, and a greater tendency to recurrence of caries. Again, we must avoid the separation of the neighboring teeth, which condition is not desirable, because it allows accumulation of food in the interproximal spaces. If we restore the original contact, or rather the proper contact, of the approximal surfaces, we are, I believe, much less apt to have recurrence of caries and obtain a much better protection of the gum in the interproximal space. I do not believe that it is always necessary to resort to extreme extension for prevention of recurrence of caries upon these interproximal spaces, for if we restore the normal contour and

the proper contact points the gum will be protected and there will be less danger of its receding and allowing accumulation of food between the contact point and the receding gum. I know that many a gum in the interproximal space has been injured because of faulty adaptation of caps for artificial crowns. I have seen many cases of pericementitis produced by such malpractice, if we may call it so, because of the imperfect fitting of the cap to the neck of the tooth causing injury to the portion of the gum which the essayist referred to, and which Dr. Black calls the gingival line, or point of attachment of the gum to the neck of the tooth. We should be very particular about avoiding such injury. Very serious disturbances may be produced in cases where we have much flattening of the contact points, producing the condition of food being lodged between the teeth and being forced down upon the interproximal tissue. I mean a flattening in both directions, facio-lingually and occluso-gingivally, producing broad contact surfaces instead of edge-to-edge contact. Not only is there danger in this direction because of flattening of the interproximal surfaces, but sometimes even in cases of normal or nearly normal contact we may have injury to the interproximal tissues, because of faulty occlusion or because of the wedging of one tooth between the cusps of the opposing teeth, forcing those opposing teeth out of position. This sometimes results in the wearing down of the interproximal tissues and produces a very disastrous train of symptoms. We must look for this condition and endeavor to alleviate it, as well as to restore the normal contact point if contact be abnormal.

Dr. B. C. NASH, New York city. The essayist has given us an admirable presentation of scientific thought as a basis for practical work. It is a fact, however, that the treatment of the interproximal space has received the consideration of skilful operators for many years. The Arthur method of artificially establishing so-called "self-cleansing" spaces is but a memory with the present generation, and was long ago condemned and relegated to

oblivion. Our own Dr. Perry, who at one time practiced it, when he realized the error of his ways confessed deep penitence, and became one of the strongest advocates and best exponents of contour fillings. Even Dr. Clowes of amalgam fame, who applied the Arthur principle with misdirected zeal to the mutilation of incisors and bicuspid, was occasionally led to apply his energy in restoring broken-down molars by joining them together with giant fillings of amalgam, obliterating the interproximal space.

Since the advent of cohesive gold more than half a century ago, which rendered possible the building-up of masses of gold by the welding process, a host of operators in the East, West, North, and South have applied the principle of contour restoration. It would be invidious to mention the names of the men who have distinguished themselves in the memory of the present generation, and when we consider the difficulties surmounted by them with a limited equipment of appliances as compared with the modern expedients, we can only marvel at the triumphs of skill which emanated from their hands.

It was not until about 1895 that the Black method of cavity preparation with extension for prevention was demonstrated before the First District Dental Society of New York, through Black's disciple, Dr. E. K. Wedelstaedt, who descended upon us out of the Northwest, and showed with a wealth of enthusiasm and dogmatic insistence his conception of what dental operations should be. That was the first scientific exposition of the Black method that I remember, and we have listened to Dr. Wedelstaedt and have observed the operations of his colleagues many times since with interest and profit. Numerous study clubs have been the outgrowth of the Black teaching, one of which has been in successful operation for several years in New York city, with Dr. Konzett as its preceptor.

Instruction in operative dentistry has received a stimulus as a result of these teachings, and the first-year class of the Dental Department of the University of Pennsylvania is expected to have a com-

prehensive knowledge of the fundamentals represented by the essayist, and to pass an examination upon it.

While the principles of contour restoration are well understood, and the ideas inspired are conceded to be important at any age, yet expediency rather than idealism must prevail in caring for the teeth of our young patients who are incapable of enduring long, tedious, and painful operations, and whose teeth may be carried along with comfort through the critical period, of say from the eighth to the twentieth year, by the use of plastic materials. The results of such efforts should not be hastily condemned by the idealist without considering what has been attained by conscientious effort, for in such cases the most confirmed idealist must needs be conservative, having the welfare of his patient at heart.

The family practitioner who cares for the many is prone to consider the needs of his patients and to supply them by humane methods, rather than to exploit his ability to perform by heroic measures the more fanciful operations, which may have no more real saving value than the simpler and well-tried methods which have proved reliable in his hands. It is by dental nursing that teeth are preserved during the critical period when caries is rampant and the endurance of the patient is at a minimum, and often a carefully placed gutta-percha filling is as effectual a tooth-saver as the best constructed gold plug. Without disparaging gold or porcelain inlays, it must be said that they have but a small field of usefulness except in adult teeth, and while these have proved their value in well-chosen cases, there are but few of the older methods which we can well afford to abandon.

Dr. FRIESELL (closing the discussion). Unfortunately, I did not hear all of Dr. Starr's discussion, but simply a reference to the one point of objection which he brought out. As I understood it he objects to the rounding away of the approximal surfaces from the point of contact toward the labial and lingual, or bucco-lingually, his belief being that contact edges afford better protection to the

interproximal gum tissue than do contact points. Many points in operative dentistry today rest on this same basis of opinion; one man believes one thing and another believes something diametrically opposite, and frequently, while these points of difference seem unimportant, they concern the very fundamentals of dentistry, and the truth or falsity of either opinion is very certainly demonstrable, if we care to subject the matter to careful investigation.

Considering this broad bucco-lingual contact, I have only to say that if anyone who is interested in this subject will take a few hundred extracted teeth and study the beginnings of caries on their approximal surfaces, he will very soon note that the teeth which show the tendency to a wide spreading of caries from buccal to lingual are those that have broad contacts bucco-lingually. Also, just in proportion as we find the contact of the approximal surfaces limited in the bucco-lingual direction, we find the spread of caries restricted. The greater the bucco-lingual width of the contact, the narrower will be the buccal and lingual embrasures; the narrower these embrasures, the less opportunity food will have to sweep down through them, and therefore less of the approximal surface of the tooth will be swept by the food in mastication. Although one may advocate mouth-washes, sterilization of the mouth, tooth-powders, tooth-brushes, etc., there is no possible device that will have anything like the efficacy in keeping teeth clean and preventing caries as has the scouring or sweeping of food over the tooth-surfaces in active mastication.

I mentioned a point which possibly I did not bring out as forcibly as I should have done this morning, that is, that unless our operations are so made that they leave the dental apparatus in such condition that the patient can use his teeth in *active, forceful mastication*, these operations are failures. We never find caries starting on the surface of a tooth that is swept by the food in mastication, and just as soon as you prepare the surfaces of the teeth that are not covered by the gum so that they will be swept

by the food, you will leave them immune to attacks of dental caries. You never find decay occurring on occlusal surfaces or clean portions of the teeth unless there is a fault in the enamel, unless caries reaches into the fissures that are not scoured by the passage of food.

Another point I would bring up. This model represents a crude attempt on my part to give you a view of the interproximal gum septum from the mesial and distal aspects. Just as we make contact edges we have the crest of that gum septum flattened. [Illustrating.] Contrast the two. Here you have the food forcing in through the lingual embrasure; it does not strike the crest of the gum septum directly but at a tangent, and is forced through the embrasures by the cusps of the occluding tooth, and these approximal surfaces are kept cleaner than the patient can keep them by any artificial means. If the food be permitted to strike the gum septum at right angles, the gum becomes so sore that the patient cannot bite on that side, and this is what happens when we make crowns or fillings without proper contour. On the other hand, if we have the edge contact, the food fibers pass through; they are not swept out by the next mass of food but become impacted on the crest of the gum septum and force the septum away, and we then have the gum septum very quickly reduced to this flattened form. [Illustrating.] This leaves just so much of the approximal surfaces unprotected by gum tissue and unswept by food during mastication, and therefore exposed to the uninterrupted action of the micro-organisms of caries. This model was enlarged to scale from this natural jaw, with some very slight modifications. The jaw has been in use longer than the model, and its contacts are slightly worn, but it will indicate very nearly the normal contact point. This model is to represent what the ideal condition would be [illustrating], and while we can hardly expect to attain the ideal, if we have the ideal firmly in our minds and keep everlastingly striving for it, we may approach

it, otherwise we will not get within speaking distance of it.

In closing, I wish to say that the writer has not attempted to present anything new in dentistry; he has endeavored, if possible, to call attention more forcibly to a few of the fundamental principles of operative dentistry that seem to be universally neglected.

The next order of business was the Report of the Committee on Practice, by Dr. W. B. DUNNING, New York city, as follows:

REPORT OF COMMITTEE ON PRACTICE.

It is to be hoped that in the course of a few years, a report on dental practice will consist largely in a description of improved technique in methods of controlling those conditions of the general system which underlie diseases of the mouth and teeth, and that the dental specialist of that future period may be more occupied during his year's work in maintaining health than in combating disease.

ANALYSIS OF THE BLOOD AND THE SALIVA.

The study of the blood has recently led to a much fuller comprehension of metabolism and of the conditions which underlie inflammatory processes. The paramount importance of this knowledge is stimulating investigators to the most thorough and precise work. The saliva and its functions, and the consequences which attend each deviation from its normal consistence, are being more fully understood, and we have reason to believe that a practical method of controlling the normality of this secretion may soon be reached.

These possibilities open to us new worlds of usefulness, but at present it cannot be said that they have emerged from the department of scientific research. The practitioner is rarely an investigator in the true sense of the word. The average man in full practice must

await, so to speak, the "predigested" food supplied by his scientific brethren, and until such food has been prepared he must go hungry. While dental practice, therefore, is each year being more illumined by work in the direction of preventive medicine, our most tangible efforts still consist of curative and restorative procedures.

To come directly to this everyday and exceedingly important branch of our work, it may be said that the advances of the past year have consisted chiefly in the trying-out of known processes, rather than in original departures from known fields. We have been, perhaps, so dazzled in learning the capabilities of the cast gold inlay and so baffled by the fascinating but elusive qualities of the silicate cements that attention has been diverted from other matters. We are, as usual, running something to the ground, and this restless tendency to enthuse and abuse will exist forever among men whose work demands high inventive ability. It is a healthy state of mind which searches with all speed the good and bad qualities of a substance or method, but the latest notion of the value of that which is being tested must not be taken too seriously, at least before the lapse of many years.

CAST GOLD INLAYS.

It is probably a safe statement that no invention that has been made during the past quarter of a century has so profoundly influenced the profession as the method of casting gold in a mold made by means of a disappearing wax core. Whether or not the Japanese, two thousand years ago, embedded crabs in clay, burned them out, and reproduced them to the last claw, in bronze, does not detract from the merits of the monumental gift made to humanity by Dr. Taggart's perfected application of this principle in casting gold inlays. Dr. Taggart "predigested" for us a method which, though not unknown, was not adapted to daily use, and since his demonstration given a little over two years ago this method has naturally taken its

place as one of our most important mechanical devices.

A number of years must pass before sufficient experience in the use of the inlay will have accumulated to justify anything like a general rule defining its scope of usefulness. With our present knowledge it would seem that the gold inlay is indicated in the filling of all cavities above the medium size where metal is suitable, and where the cutting to gain access will not be unduly great. The writer appreciates that this is a very vague statement, and open to a hundred interpretations. He is trying, however, to convey the general impression that all small and inaccessible cavities in which gold is indicated may be best filled under the plugger, but that cavities exceeding a diameter of about 4 mm., and especially those involving more than one surface, are best filled by means of the inlay method. Of course the larger the cavity, the greater the strain upon the tooth, the patient, and the operator in making a foil filling, and consequently the greater the advantage afforded by a method which involves no strain upon the tooth in the placement of the filling and which does not drain the vitality of both patient and operator.

The technique of inlay making is still uncrystallized in most minds. The writer prefers to make the wax core for all but the largest inlays directly in the cavity itself. If black wax and suitable carving tools are used, this operation soon becomes quite simple, and it is far more expeditious than the impression method. However careful the laboratory expert may be, the adjustment of occlusion and approximal contact from a model is liable to error. Perhaps the chief objection in my mind to the impression method is that instinctive dread of losing control of such a beautiful and important part of the work as the shaping of the filling. An artist might as well try to paint a picture by proxy. The artistic impulse is killed by this break in continuity, and when the casting is returned from the laboratory the inspiration is gone, and the unfamiliar piece of metal is fitted and set as might be a

part in a machine. It may be urged that this objection is a fanciful one. I believe such is not the case, for we all know the importance of inspiration in any constructive effort. The satisfaction of doing a useful thing in a beautiful way is of practical value. Besides being the chief compensation for a life of arduous work, it is the principal thing which renders the work possible.

In a full practice of course many mechanical processes must be delegated, but certain essential steps should never pass beyond the hands of the operator. He should carve his own inlays in the wax, and cultivate a jealous pride in the perfection of their forms. The making of the wax core in the mouth is a delicate but not difficult operation, and enough time should be spent to make the model as nearly correct in shape and finish as circumstances permit. The necessities in this work train the eye to a very accurate sense of cavity formation. Having removed the core, the operator will not be quite satisfied until he has personally attached the sprue and poured the investment, both of which steps are done before the patient, and are understood to be vital parts of the operation. At this point the case may properly pass into the laboratory.

This casting process is applicable in innumerable ways to the conditions which we have to meet. It has wonderfully simplified the setting of porcelain crowns. The crown having been approximately ground to occlusion, the rootwise surface is liberally cut away except at the labial or buccal margins, a pad of softened wax is placed over the root, and the crown and pin—preferably a removable pin—are forced through the wax to the proper position. The whole is then removed, trimmed, replaced; then removed, invested, and the wax reproduced in gold. A gold base which perfectly fits the root is thus easily made. Many similar and very ingenious applications of this principle are familiar to you all.

SILICATE CEMENTS.

We have not quite made up our minds as to the real value of the silicate ce-

ments. This material, under many names, has been enthusiastically tried, praised, and then—six months later—found not exactly wanting, but not quite the beautiful substance which it once seemed to be. And yet many fillings two or three years old and in perfect condition come under observation and keep alive the hope that we do not yet fully comprehend all the factors involved in its use. The problem of discoloration is very baffling, and apparently cannot be explained by the fact of metallic instruments having been used in packing the fillings.

At present it would seem that the correct use of the silicate cements is to fill small cavities so placed as to be inaccessible for porcelain without too much cutting, or cavities in which a porcelain inlay could not be retained. All things being equal, however, the porcelain inlay remains superior to the silicate filling, both as to color and lasting qualities.

AMMONIUM BIFLUORID IN THE REMOVING OF TARTAR.

We are indebted to Dr. Joseph Head for the very valuable discovery that ammonium bifluorid will soften and remove tartar, without otherwise affecting the teeth. This compound, which was given to the profession at the meeting of the National Dental Association in 1908, is prepared in the following way, as quoted from Dr. Head's paper:

Hydrofluoric acid is neutralized by ammonium carbonate until there is complete neutralization of the acid. This solution is then filtered. This liquor is ammonium fluorid and has but little power of chemical action. This ammonium fluorid solution is then evaporated in a leaden dish to one-half of its bulk, filled up to its original bulk with hydrofluoric acid, and evaporated to one-half of its bulk again. This gives us the hydrogen ammonium fluorid of which this paper speaks. It evaporates readily, distributing its crystals on all adjacent objects, and is extremely difficult to restrain except in a wax bottle. The dried crystals wetted with water do not seem as effective as the original liquor from which water has been excluded.

The writer served on a committee appointed to investigate the action of this substance. A freshly extracted tooth, covered with hard tartar, was immersed for six hours, when it was found that the tartar was so disintegrated and softened that much of it had fallen away, some particles which had remained being of a cheese-like consistence. This was of course an extreme test. The application in the mouth, which should be made after having scaled the teeth as thoroughly as possible, consists of a drop or two (from a syringe or plier points used as a drop-carrier) carefully placed in the pocket about the neck of the tooth. In about two minutes a sharp burning sensation is reported by the patient, when he is allowed to rinse the mouth. The gum tissue has been slightly whitened, as from the effect of carbolic acid. Upon seeing the case a few days later a marked improvement in the gingival border will be noticed. The gum has lost its turgid, flabby character and has thinned down and tightened about the tooth in a very gratifying way. It is difficult to determine how much of this effect is due to the actual removal of tartar, and how much to the remarkable stimulation of the soft tissues. In either case the benefit is very marked, and we undoubtedly have in this substance a positive help in treating desperate pyorrheal conditions. The action of the drug is severe, and care must be taken to confine the liquid to the field of operation. Cotton rolls should be placed and rapidly changed to prevent the overflow of any excess. It must be remembered that this "tartar solvent" will also attack glass or porcelain, and is therefore to be kept in a gutta-percha or paraffin bottle.

It has been the purpose of this brief report to refer to certain new and unsettled questions rather than to make an attempt to review those accepted methods of our practice which have survived the test of time.

Respectfully submitted,

WM. B. DUNNING,
Committee on Practice.

Dr. HILLYER moved that the report of the Committee on Practice be received, and that the discussion be delayed for a few minutes to admit the awarding of the Fellowship medals.

Motion carried.

PRESENTATION OF FELLOWSHIP MEDALS.

The Fellowship medal of the Dental Society of the State of New York was then presented to Dr. M. H. Cryer, Philadelphia, Pa., by the president, Dr. L. MEISBURGER, who spoke as follows:

Dr. Cryer.—Little did I think when graduating from the University of Pennsylvania that I would ever have the honor of presiding over this the representative body of dentists of the state of New York, and much less that I would have the privilege and honor of performing so pleasant a duty as the one devolving upon me at this time; but we are creatures of destiny, and it was ever thus.

I would say for your information that a fund was established in 1905 through the generosity of one of our esteemed members, making it possible to present each year a medal to some man who has gained distinction in scientific research work or who has become pre-eminent in our profession along other lines. That you have fulfilled both of these requirements nobody can deny. It has been your lot since your early life to be a leader among men—as we find you on April 8, 1865, commissioned a major, and at dawn of the following morning having the honor of starting Grant's last fight with Lee, and commanding the escort of Lee from Appomattox to Farmville upon that general's surrender. From your entrance into dentistry in 1874 and subsequent graduation, your rise has been rapid, as we find you very early in the eighties prominently engaged as one of the leading dental practitioners, and later on your findings were accepted in your chosen lines of oral surgery, and especially that of the internal anatomy of the head, by such leading authors as Gray, Kyle, Burchard, Marshall, and others. In 1896 the University of Penn-

sylvania, appreciating your sterling qualities, appointed you to the chair of oral surgery. In 1893 we find you in attendance at the Fourteenth International Medical Congress, which assembled in Madrid, Spain, representing dentistry and the University of Pennsylvania. At the last meeting of the National Dental Association, held in Birmingham, it was the unanimous opinion of those having the matter in charge that you be again asked to represent the United States in presenting a paper at the Fifth International Dental Congress, to be held in Berlin this summer. And so I might go on extolling your many good qualities and attainments, but time forbids, and therefore it gives me great pleasure to present to you this medal, and by virtue of my office create you a Fellow of the Dental Society of the State of New York.

Dr. CRYER, in accepting the medal, said: *Mr. President and members of the Dental Society of the State of New York*,—It gives me great pleasure indeed to accept this medal. It was through some of the members of this society that I first had the opportunity to show my anatomical work before it, and in this very room. In another paper read before the society four years ago I also had the opportunity to demonstrate what I thought at that time of the occlusion of the teeth. And so I owe to this society and to its members, and to the members of the profession in this state, my opportunities to show my endeavors in my chosen field.

Mr. President and members, I thank you once more for your kindness.

Dr. W. S. Rose, Schenectady, president for the year 1908, was asked to present the medal awarded last year to Dr. E. S. Talbot of Chicago, Ill.

Dr. Rose, in presenting the medal to Dr. Talbot, spoke as follows:

Dr. Talbot,—In behalf of the New York State Dental Society, I wish to assure you of the pleasure which it affords us to have you present at this meeting as our distinguished guest. The invitation was extended that we might pay you the highest tribute within our power in recognition of your devotion to dental science. We realize that you have won

your distinction not by way of the rostrum with its accumulation of successes and attendant plaudits, but in the privacy of your apartments you have burned the midnight oil in unselfish search for truth, having no thought for preferment, but for the advancement of the profession which you have chosen for your life's work.

If science is slow to bestow its favors, it is impartial in its awards. Like our country, it has no hereditary laurels nor royal road for undeveloped talent, but it has victories for the power arising from defeat, and trophies for the genius of unremitting toil.

This medal is the expression of our society in recognition of your eminent services through our profession to humanity, and in its presentation I pronounce you a Fellow of the Dental Society of the State of New York.

Dr. TALBOT, in accepting the medal, spoke as follows:

In thanking you for this Fellowship and medal, I am moved to say that this is the first honor I have received from my *confrères* in America in recognition of the many years which I have devoted to the advancement of our specialty. I appreciate these honors, and also the many words of encouragement that I have received from many members of this organization.

When your committee voted me these honors last year, I expected to be present to receive them, but serious illness in my family prevented. It gives me great pleasure to be present at this meeting. I know of no state society where there are so many gifted men, so much enthusiasm, and so much earnest work as is to be found in this organization. I have watched the progress of this society for many years, and it is an honor to be counted as one of its members.

The younger men in the profession must take up the yoke which has fallen so heavily upon the shoulders of the older men. This work can only be accomplished successfully by young men who have a broad, liberal collegiate education, and who become enthused by hard and close application in studying various lesions of the mouth, their effect upon

the general system, and *vice versa*. I am glad to see this spirit among the members of this society.

I have been requested to say something of my own researches, so I will give you a brief outline. Forty years ago, when I was a dental student, the manner of teaching pathology made a great impression upon me. After graduation, when making a closer study of the dental textbooks, I saw that the connection between the pathology of one tissue of the mouth and that of another were being entirely neglected. I believed these connections to exist and resolved to prove my theory, thereby presenting a simple and rational system of the pathologic connections of all the structures of the mouth. With this theory in mind, I took as a first step a regular course in medicine.

At the time when I was a dental student, Darwin's theory of natural selection had been in existence only about ten years, and was very little understood, much less studied. About that time Huxley lectured and wrote upon that subject, and thus popularized Darwin's work. It seemed to me, if there could be such a thing as evolution by natural selection—why could not changes take place in the opposite direction or by way of degeneration? The first few years of these researches were up-hill work. I groped in darkness. Little or nothing had been written upon the subject that might have lent a helping hand. Twelve or fifteen years later, books and papers appeared along different lines which gave me stimulus. I owe much of my success to Dr. James G. Kiernan, formerly of New York city but now of Chicago, who assisted me in establishing my working hypothesis.

For more than thirty years all my spare time has been given to research work, beginning with the large problems of development and growth of structure, which work was carried on systematically. Some of the problems have been most difficult. For example, it required the collection of 3000 models and eight years' time to classify and name the irregularities of the teeth; four years and seven laboratories were engaged with studies of the tissues of the mouth in interstitial

gingivitis; five years were consumed by investigations upon the dental pulp, and over twenty years were spent among the various defective classes of this country and Europe in studying and outlining deformities of the head, face, nose, jaws, and teeth. A part of the results of this work has been published from time to time in the dental, medical, and scientific journals both here and abroad. I am still pursuing my research work.

I wish to again express my appreciation to this society for the honors bestowed upon me today.

The discussion of the report of the Committee on Practice was then taken up, as follows:

Discussion.

Dr. A. L. SWIFT, New York. It is to be hoped, as the essayist suggests, that conditions will be such in the course of a few years that the report of the Committee on Practice will of necessity largely consist of considerations as to the most approved methods of controlling conditions which will maintain the health of the mouth and teeth, with the inherent benefit to the general health.

The careful investigations which, as referred to by the essayist, have recently been directed to the study of the blood and the saliva give promise of more definite knowledge, which will undoubtedly prove of immense practical value.

I agree with the essayist that the gold inlay is not indicated in small cavities which may readily and with better judgment be filled with foil; protection of the pulp is important, and the use of the hollow inlay for such cases is indicated. As to technique, I prefer in most cavities the impression method, which has proved the most satisfactory in my hands, trying the wax core in the cavity after it has been carved to proper shape and the sprue has been attached, and making any necessary changes as to contour and occlusion.

I agree with the essayist as to the questionable value of the silicate cements in regard to permanence and color, but, like others, I have had numbers of sur-

prisingly successful cases in its use. I believe much depends upon the method of manipulation.

I have been using Dr. Head's ammonium bifluorid quite extensively and with uniformly good results, and consider it invaluable; its stimulating action is remarkable, and it certainly softens calculous deposits. I have also used it most successfully in the treatment of fistulous tracts and in pericemental abscess, and for spongy and inflamed mucous membranes when pyorrhea was not present.

Dr. JOSEPH HEAD, Philadelphia, Pa. The gold inlay will be valuable in large operations, because it gives the best temporary results, and in my opinion also the most permanent results. In very small cavities, however, in which the ordinary gold inlays would not be indicated, I make my gold inlays in another way. If we have, for instance, a small cavity on an approximal or on the masticating surface of a tooth, and are anxious to make use of the protective action of the cement, it would be almost ridiculous to go to the trouble of making a wax model. In such instances I prepare the cavity as for an ordinary gold filling with fairly generous undercuts, then having at hand a sponge gold, such as moss fiber, which has been thoroughly annealed, I mix a little cement to a creamy consistence, and line the walls of the cavity with it. I then take a piece of gold just sufficient to fill-in the bulk of the cavity, press it into the center of the cavity, and work toward the walls, expelling as much of the cement as possible from the margins. The margins can then be scraped and cleaned and the cement allowed to set for two or three minutes. I then condense the gold thoroughly, first with large, then with small instruments. Then, after thoroughly smoothing the margins, I fill the entire cavity with a piece of gold put on with large broad instruments. This can easily be accomplished in from five to ten minutes, and in that way I make practically a gold inlay as perfect as can be made, because we have a gold filling set in cement with cementless margins. I have been so convinced of the efficacy of this method that

I use it for all my gold fillings. I fail to see any reason why gold fillings should be put into teeth unprotected by cement, and I no longer believe that it is good for the enamel to be hammered, even through a thin layer of gold. From experiments I have found that if an extracted sound tooth is hammered with a mallet and a smooth-pointed plugger, or the Bonwill plugger, and then dropped into a solution of one, two, or three per cent. lactic acid for an hour or two, on taking it out the first signs of decalcification appear at the places where the blows have struck, which shows conclusively that while the blows do not have any macroscopic effect observable by the eye, microscopic defects have been made, since the acid decalcification first attacks these points. Prolonged hammering is not necessary, nor is it good for the dental tissue. In very large gold fillings I follow the method just described, which affords a great increase of speed, the results of which have lasted for years in my patients' mouths.

Concerning silicate cements, I would say that I have had some good results. I am still an advocate of porcelain fillings, notwithstanding the fact that, as our friend Dr. Hofheinz has said, there is a shadow about the porcelain filling in the cement line; yet, with all its faults I love it still. Although I have had excellent results with the silicate cement, it does not seem to afford universal success in spite of perfect manipulation. I have asked manufacturers to correct any faults in my technique, but in each instance I have been told something different. They first told me to use cosmolin or vaselin, then to use neither. I was advised to rub very carefully so that the cement would be thoroughly incorporated, and again not to rub it, but to cut it into a mass. So while the manufacturers and the originators of silicate cement are in doubt as to how to get perfect results, they must pardon me if I put it somewhat in the class of Archite. Archite in one or two instances gave me excellent results, but if I had kept on using it I would have had no patients now. I cannot help feeling that while we have had much to be thankful for

in regard to the silicate cements, their merits are still doubtful. I hope that silicate cement will continue to be improved until it is of good, lasting quality; then, I feel, the days of the porcelain inlay will be numbered, but at present we had better continue using porcelain inlays, and we need not be in a hurry to sell our electric furnaces.

Concerning the tartar solvent, I only wish to say that it gives absolutely good results in my hands. It clears up fistulous tracts, and seems to discriminate between live and dead bone, causing rapid healing when injected into abscesses where there is dead bone at the bottom. It seems to cure pyorrhea pockets that without its use could not be cured. I would only say that it has been far more efficacious than I had hoped, and since it is now in rather general use among my professional friends, I shall leave the final verdict to them.

Dr. R. H. HOFHEINZ, Rochester. It is useless for me to go into details of Dr. Dunning's report, because he covered the ground thoroughly, and the inlay question will be discussed later. In regard to silicate cements, I agree with Dr. Head very largely; for the best *résumé* on the subject I refer the profession to Dr. Dunning's article in the *Cosmos* for April.

I would say a few words in regard to the tartar solvent. Since Dr. Head introduced it to us in Rochester about three weeks ago, I have applied it more or less every day, and I can say that it is without a doubt the most remarkable tartar solvent that I have known. As to whether it does any damage to the cementum, we have as yet to accept Dr. Head's and Dr. Dunning's statements, but this question can only be definitely settled by the microscope.

I wish to sound a note of warning in the use of the bifluorid of ammonium. I have seen Dr. Head giving a clinic in Rochester, when he used it quite freely in a rubber syringe, in which we cannot very well gage the amount of the fluid injected into the pockets. I am not at all reluctant in relating one case in which I had serious results after its application. I used the syringe that Dr. Head rec-

ommends, and with extreme care injected the drug into the sockets of two or three molar teeth of a man of sixty-five years of age. I asked him to tell me as soon as he felt the slightest pain. I had the tongue and surrounding tissues protected as best I could. A few minutes after the injection the patient said, "Doctor, that hurt badly, but I am willing to stand almost anything to retain these teeth." The next day, when I saw the patient, the tartar was removed, and so was almost every tissue on the tongue and cheek of the poor man, the bifluorid of ammonium having penetrated the napkin. After this experience, I say, Be careful. Not everybody can be quite as successful with this drug as Dr. Head, especially when beginning to use this more or less irritating fluid. Milk of magnesia will neutralize the acidity almost immediately to a large degree, but unfortunately it was not applied in the case reported until it was too late. Instead of applying the tartar solvent with the syringe in the sockets of two or three molars, I now apply it with a fine bamboo stick in the same manner as I used to apply trichloroacetic acid for years, obtaining the same results as with the syringe. It is well for beginners to be conservative in the use of this medicament.

That, however, does not detract from the efficacy of the drug, but simply shows that although he had been warned, the patient did not follow my instructions at the time of application. The good effects of this drug seem to be attributable not only to its power of dissolving tartar, but largely to its stimulating action upon the periodontal membrane, and possibly the gum tissue itself. If Dr. Head and others, as they tell us, by the use of bifluorid of ammonium have cured cases where there was relatively little tartar, little or no pus, but much loosening of the teeth, the periodontal membrane must have been restored to a healthy action, possibly by the chemical action of the drug upon the calcic deposits in the membrane itself. If so, the importance of this drug as a remedy is greater than its action as a tartar solvent, and I hope the profession will give

Dr. Head full credit for the benefit which he has bestowed upon it.

Dr. H. L. WHEELER, New York. I should like to say a word in regard to Dr. Hofheinz's experience with the tartar solvent. I have used it continuously since last October, and while it is an irritating substance and needs to be used with much care and causes pain sometimes, I have never yet seen a case of burning of the tissues of the mouth or tongue or mucous membrane in any of my patients. I have used it a great many times, and warn the patient that it may possibly cause pain; but the results are beneficial, and the patients are willing to stand the pain for the immediate improvement that occurs after its use. I agree with Dr. Hofheinz that its value lies in the stimulation of the peridental membrane quite as much if not more than in its action as a tartar solvent.

Dr. HEAD. With regard to the burns, I can only say that in my preliminary tests, first on myself and then on a few devoted friends, I had results even greater than those spoken of by Dr. Hofheinz. But let me state how I should treat a particularly sensitive mouth, some mouths being much more irritated by the use of this drug than others. In those mouths which are at first very much irritated, after three or four treatments the gums seem to become accustomed to the drug and less sensitive, in the same way as skin specialists find that skin that at first is hardly able to tolerate a certain percentage of salicylic acid, after a time tolerates double or even triple that percentage. However, when I suspect trouble, or when a blonde patient with very sensitive skin presents, I first go over the corners of the mouth and lips with albolene. Then, according to the suggestion of Dr. Finley, I cover both sides of the adjacent gum with a thin layer of Phillips' milk of magnesia. Both sides of the gum are then carefully protected with a cotton roll, which may be kept in position with the cotton-roll clamp. Then the point of the syringe is inserted into the gum, it being very carefully noted when the pocket is full. As has been remarked before, we have no efficient syr-

inge, therefore when the pockets are over-filled, the drug flows over the gums; it must be at once wiped off, and no subsequent irritation will take place. Super-sensitive mouths should be gone over with milk of magnesia, but not ordinarily healthy mouths, because it is necessary that the acid in the pocket should be left unneutralized. In the pocket the tissues can tolerate the tartar solvent without any apparent difficulty. If, however, as it sometimes happens, even to the best of us, the syringe slips and discharges a stream into the mouth in a way that is most unpleasant for our dignity and our patient, it is best to remove everything from the mouth, rinse it, gargle the throat, and start over again. It is advisable to change the cotton rolls after each application, as the drug is liable to creep along the gum tissues by capillary attraction through the rolls. I should say that ninety-nine out of every hundred burns are occasioned by the cotton rolls not having been changed immediately after the application. If in a patient the tissues are extremely sensitive, and more irritation ensues than you expected, I should suggest again to follow the advice and experience of Dr. Finley, who allowed me to give a demonstration on him at Birmingham, and found the use of milk of magnesia as a mouth-wash to have a wonderful tendency to take away the smarting and to restore comfort, although in using it some of the acid in the pockets is unquestionably neutralized and the efficacy of the application is impaired to some extent.

Dr. ROSE. Is there any reason why this drug should not be applied in the way that Dr. Hofheinz suggested?

Dr. HEAD. This medicament seems to have some affinity for almost any kind of instruments, for your hands, and for your patient's clothes, but no effect at all on wood; therefore the method of application suggested by Dr. Hofheinz seems excellent, and I hope he will send me some bamboo rods, which I should like to try in this work. The greatest difficulty has been to get an efficient vehicle for applying the solvent. It

would be excellent if we could get a plunger syringe, the plunger to be fitted with a screw that would control the amount forced out, and I have heard that Dr. Wheeler has such a syringe. I have had a number of syringes presented to me for trial, and I have even made one or two myself, but after having been used for some time they all seem to have the unfortunate habit of discharging backward over the fingers and on the patient. While possibly the greatest good is accomplished by a liberal use of this solvent, so that the pockets are quite full, yet, if there is any doubt of our power to control the solvent, Dr. Hofheinz's method seems a most excellent one. The bamboo or quill toothpick, properly inserted and used, may be a very excellent vehicle for distributing the drug in the pocket.

Dr. ROSE. Speaking of the syringe with a platinum point, why not wind cotton on a platinum broach and apply the drug in that way?

Dr. HEAD. That might be all right, but in withdrawing the cotton you would withdraw a portion of the solvent. In large pockets it may be expedient to apply a large piece of cotton saturated with the solvent, and to allow it to stay in the pocket for two minutes, then withdraw it and allow the patient to rinse the mouth; but, unfortunately, in many instances the gum is very close to the teeth, and in nine out of ten cases the forcing of the cotton into the pocket would cause almost all of the solvent to be squeezed out before it gets into the pocket.

A MEMBER. How often do you use the solvent?

Dr. HEAD. An application made not oftener than twice a week, and ordinarily once a week, is most efficient. In a case of very bad inflammation, I should generally make one application on the inflamed portion. One week afterward the inflammation will be found to be much reduced, and another application can be made, and at the next visit the inflammation will be still further reduced. Before making the third application, I should go down into the pockets with

scalers and search for tartar, which ordinarily will be found loose. While softening the tartar this solvent at the same time seems to attack the bond between the cementum and the tartar itself. After two or three applications the tartar can be removed in loose pieces. This is shown by the fact that the cementum appears very smooth. The next time when you search for tartar you cannot possibly enter into the pocket so far, and the next time still less, until by-and-by the gum adheres to the tooth.

Another very interesting point in this was brought out by Dr. Hofheinz, when he suggested that he was not at all certain whether that effect is due to the stimulation of the peridental membrane or whether bony ankylosis takes place. The latter may be possible, as in some cases I have noticed that teeth which were badly denuded and sensitive up to two-thirds or even to the tip of the roots, became firm after the use of this solvent. These teeth could not have become firm owing to the ordinary re-establishment of the peridental membrane, because there was such a large leverage for such a small amount of membrane to sustain. But bony ankylosis such as takes place in implanted teeth might explain it.

A MEMBER. How many pockets do you treat at one sitting?

Dr. HEAD. That depends on the number of pockets present. In average patients who do not protest vigorously, I generally go over the entire mouth, but I should not advise this for the first treatment, because you may cause a certain amount of irritation, which might alarm the patient.

Dr. A. L. SWIFT, New York. Contrary to Dr. Head's advice, I use a Dunn glass barrel syringe with a platinum point, although the acid has a slight action upon glass, but I find that if immediately after being used the syringe is thoroughly cleansed with water, the action of the acid upon the glass is so slight that it is of no importance, as evidenced by the fact that one syringe was used several times daily for five months before the glass at the portion where the thread is screwed into

the metal cap became so thin that it broke in unscrewing. With this syringe you can control the application with absolute certainty. After carefully protecting the surrounding tissues with a napkin, I saturate the napkin with milk of magnesia, taking care that the magnesia does not reach the pockets to be treated, thus avoiding the danger of the drug soaking through the napkin and coming in contact with the tissues, which is often the cause of severe burns.

By this method I can safely use the solvent freely, allowing it to slightly overflow the pocket and to remain upon the outside tissues for a little less than a minute without causing the slightest burn; then with cotton I wipe off the tissues and apply the milk of magnesia, not allowing it to enter the pockets, leaving the solvent in the pockets for about two minutes before rinsing the mouth.

Dr. M. L. RHEIN, New York. The results produced by this admirable preparation which Dr. Head has given to us seem to greatly depend upon the technique of procedure. In my own practice I use a method slightly different from any outlined here. I use the syringe and also carriers made from orange-wood sticks and from platinum broaches, somewhat similarly as described by one of the speakers, but I make a distinction as to where I use the syringe or the carrier. My technique also differs from that described by Dr. Head. I do not like the idea of indiscriminate application either of this remedy or of any other form of treatment of the whole mouth at one sitting. In my hands the drug has worked so admirably that, with one or two exceptions, one application brought about the complete local cure of the very worst conditions. I rarely treat more than two teeth at one time, and frequently not more than one. In pursuing this plan it is perfectly possible to treat a set of teeth every other day, giving the patient three treatments a week if necessary.

The distinction which I make between using the syringe or the broach or orange-wood stick is as follows: If a pocket or a portion of the tissue is very extensively

involved, the solvent is very readily applicable with the syringe, which insures a wide area of efficacy of the remedy; but in a great many cases only one or two roots of a multi-rooted tooth are involved. By the use of the radiograph we can exactly determine the portion of the root which it is desired to reach, and in such cases the use of the broach or the orange-wood stick is preferable.

I do not agree with Dr. Swift in his advocacy of the glass syringe, notwithstanding the success which he reports, for two reasons: First, we are not at all sure as to the effect of the dissolved glass in the mouth; second, and much more important, the point of the syringe might burst in the mouth during the treatment.

Dr. M. F. FINLEY, Washington, D. C. It gives me great pleasure to relate my first experience with this drug at Birmingham, where I offered myself for an operation to demonstrate its use. We all know that in a public demonstration there is a greater liability to an excessive application than in private practice, and because of the necessity of the clinician's telling all those present what he is doing, which requires more than two minutes, you can readily understand that a burn resulted from the use of this bifluorid of ammonium or tartar solvent.

Dr. Head said in his clinic that simple water was sufficient for washing the mouth if the acid comes in contact with the soft tissues. I realized from my experience that water did not have the effect desired, and it occurred to me that milk of magnesia would neutralize the action of the acid. There was not enough pain to make me weep, but sufficient to make me uncomfortable, and instantly after the milk of magnesia was applied all pain ceased, and there was no irritation, and although the mucous membrane was burned and peeled off, there was no soreness afterward. I have had such success in applying this preparation to my patients since then that I am glad to be classed in the category of Dr. Head's friends upon whom he has tried the drug.

Regarding the technique of applying

the bifluorid of ammonium, the plan adopted by Dr. Head of flooding the pyorrheal pockets or fistulous channels with a syringe is surely preferable to the use of either wooden or platinum points, which carry only a drop or so into the diseased territory, for the reason that these pockets are filled with fluid, and unless sufficient tartar solvent is introduced at the deepest part to displace all fluids, the remedial effect which is claimed by Dr. Head cannot be obtained.

Dr. A. R. STARR, New York. Dr. Head mentioned his method of preparing cavities and filling them so as to assure the benefit of the underlying cement. There is a very easy and simple method of making a gold inlay which will produce similar results. This method may be described as follows: Take the impression of the cavity with platinum foil such as is used for porcelain inlays, burnishing it well to the margins. Remove it from the cavity, and then, in order to prevent the gold from running over the margins of the matrix in casting, coat all of the upper surface except that part representing the cavity and all of the under surface with a creamy mixture of powdered asbestos and water. Then fill the matrix with pure gold, trim away the platinum from the margins, and the inlay is ready to set. In this way you get the benefit of the cement under the gold, and the soft gold being malleable, you can burnish it down thoroughly and obtain perfect adaptation, with no cement showing around the margins. In regard to gold inlays in general, I think they ought to be used more than they have been, although I realize the fact that they are not applicable in every case. A great advantage is derived from their use in approximal cavities, since we are usually obliged to extend the cavities so as to reach lines of safety in order to obtain a correct impression and remove it without injury. That is one of the advantages in gold inlays.

Dr. Friesell did not seem to understand what I said of the contact point in discussing his paper. I realize that a small point of contact is unquestionably

the best to prevent recurrence of caries. My contention was that in the normal condition we find that the points of contact of the approximal surfaces are broader from facial to lingual than in the opposite plane, and I wished to emphasize that this arrangement probably gives better protection to the underlying gum tissue than would the small point of contact.

Dr. DUNNING (closing the discussion). The discussion has centered about Dr. Head's solvent, and very naturally so, because that subject is the least known of the three subjects I have dealt with today.

Before leaving the gold inlay, I wish to speak of one phase in regard to Dr. Starr's method which seems to me not quite advantageous. His method, with which I am not very familiar, may be useful in the filling of simple cavities on other than occlusal surfaces, but it would probably be difficult to obtain a correct occlusal surface by this method; at least we should have to grind the filling to occlusion later on, whereas by the use of a wax core we have an exact reproduction of the occluding cusps.

We all know the advantages of Dr. Head's method of using crystal gold in fillings, but in regard to the simplicity of this method and its being unnecessary to be careful in the adaptation of the gold at the margin, it seems to me that if the cement does not extend to the enamel margin, you must be as careful as ever to secure a tight joint.

Dr. Hofheinz said that microscopical examination should be made of teeth treated with the ammonium bifluorid in order to obtain some accurate knowledge of its possible effect upon the tissues of the teeth. Dr. Head, in his paper read in Boston last summer, remarked that the effect of this preparation upon enamel seemed to be negative even under the severest test, also its effect upon the cementum was negative, as I remember the paper; but he admitted that there was a slight action upon exposed dentin. That was borne out in the test then made by the committee, in which a freshly extracted tooth was placed in this solution

for six hours; upon examination by the naked eye there was absolutely no change in the enamel; the cementum was also found to be perfect, but at the cervical portion of the tooth where the dentin was exposed, a slight, very superficial effect upon the dentin was noted. You must remember, however, that this was after a test of six hours, and I hardly think that any patient, even one of Dr. Head's most enthusiastic patients, would submit to a test of such severity, and, as Dr. Head tells us, any effect upon the tooth during ordinary treatment seems to be a negligible factor.

With regard to the application of this preparation, I have had some experience with syringes, burns, etc., and have had some trouble. I protect the gum tissue

by tampons of cotton dipped in a saturated solution of sodium bicarbonate. Several of these tampons are kept at hand, so that if a drop of the fluid comes out over the gum it may be immediately neutralized. It is extremely important to change the cotton rolls repeatedly, as Dr. Head has said, but the most efficient method of application seems to be to simply drop the acid with a pair of delicate pliers, preferably with platinum tips. With these you can pick up a drop very easily, inserting the beaks into the pockets as far as you like, and the control of the amount applied is very easy. This is an effective method of applying the preparation without danger of overflowing.

(To be continued.)

PORTO RICAN DENTAL SOCIETY.

First Annual Meeting.

THE Porto Rican Dental Society, consisting of a membership of twenty-five dentists, held its first annual meeting at Arecibo, Porto Rico, on July 4, 1909, at 8 A.M., in the hall of the Colonia Español.

The president, Dr. Manuel del Valle, opened the meeting with a very interesting talk on the society's first year's business, congratulating the members on all the exertions made during the past year in behalf of the society and the dental profession of Porto Rico.

He stated that the society had given ample proof of its success, and that, among others, one of the principal objects, namely, the prosecution of non-registered and non-licensed individuals, had been thoroughly pushed, and that in several instances the courts had already rendered judgments against these offending parties, who had been practicing illegally since colonial times, when anyone could practice dentistry without the slightest interference of the law, under the title of minor surgery.

Dr. FRANCISCO PONTE presented a very interesting and difficult case of restoration of one-half of the left mandible, as follows:

María Silva, twenty-nine years of age, a native of Porto Rico, fell while stepping on board a boat when she was nine years of age, receiving a severe trauma under the chin. Though severe inflammation set in, no doctor was called until a fortnight afterward, when the swelling of the face and cranium had assumed alarming dimensions. The physician diagnosed fracture of the jaw at the symphysis. Under treatment the patient recovered, but her facial appearance was somewhat marred owing to the fact that the physician had been called too late to bring about a correct union of the halves of the mandible.

For twenty years the patient experienced no further trouble, until in January 1908, she began to notice some swelling especially in the temporo-maxillary region of the bone, and numerous small tumors made their appearance inside of the mouth, on the palate and alveolar process on the left side of the mandible.

Dr. José N. Carbonell took charge of the case for six months; but finding no improvement he then referred the patient to Dr. Lippittit, who, after diagnosing sarcoma of the left jaw, decided upon an operation, which he performed on October 2d, assisted by Dr. Carbonell and Dr. B. R. Ashford. The entire left side of the mandible was removed, causing disarticulation in the temporo-maxillary region. The patient recovered, leaving the hospital on October 29th.

About three months afterward, in January 1909, the patient was referred to the essayist by Dr. Lippittit for correction of the deformities caused by the operation. The first step taken was to obtain a correct impression of the lower part of the mouth. From this impression a model was then made on which the base of the lower apparatus was vulcanized, using black rubber and intermediate layers of rubber weighted with tin. After finishing the base of the lower apparatus, the very simple upper prosthetic piece was modeled; its construction will be plainly understood, together with the conditions dealt with, and also the cosmetic result, from the series of illustrations. Both pieces of the apparatus were placed in the mouth, and after the bite had been taken, mounted on the articulator and adjusted as usual. They were then tried again in the mouth, and the articulation of the teeth was corrected. The vulcanizing of both pieces was then finished, using brown and pink rubber. The upper plate is held in place by very little suction and by means of telescope crowns fitted on the second molars on either side. The lower apparatus, which bears a full lower denture and restores the jaw, is retained by two of Dr. Waite's rubber suction chambers, which in this case have afforded admirable results, holding the base-plate firmly in place.

FIG. 1.



Shows the patient with the apparatus out of the mouth.

FIG. 2.



Shows the patient with the apparatus in the mouth.

FIG. 3.



Shows the patient with the apparatus in the mouth, holding a weight of four pounds.

Hearty congratulations were extended to Dr. Ponte on the great success obtained in this case—which when brought before the medical profession will tend to show that the dentists in Porto Rico are not mere “tooth-pullers” as they are so often called.

A discussion was engaged in regarding dental education in public schools, which subject had been before the last meeting, and the committee appointed for the purpose submitted a set of printed instructions on the care of the teeth for use in the schools, to be presented to the government in the hope that they would be accepted; it was also voted upon to suggest a series of dental lectures in the public schools.

The committee on Prosecution of Non-licensed Dentists reported the work done in the past year, and the question was discussed as to the work which a non-registered dental assistant could be permitted to do, and it had been decided that an assistant should be registered. A set of dental laws had been framed

during the last year and had been presented to and accepted by the government, so that the dental laws in Porto

given at the Hotel Italiano, the demonstrations consisting of the following items:

FIG. 4.



Different views of the models and plates.

Rico are now on a par with those of the United States.

The meeting was adjourned at one o'clock, and a collation was served, after which the members attended in a body a series of clinics and demonstrations

Dr. DEL VALLE explained a simple method of making cast gold crowns as follows:

Having fitted the band in the mouth and given it the proper contour, a suitable cusp is selected from a die-plate,

and a model is made of this cusp in inlay wax. The wax cusp is then attached to the band by means of a warm spatula, and the patient instructed to bite, the result being a perfectly fitting crown, without any necessity for carving. Casting is done in the usual manner.

The S. S. White Dental Manufacturing Co. presented and gave clinics on

company congratulated the members of the society on their good work, and expressed the sincere hope that the Porto Rican Dental Society would continue its successful career.

Officers. The following officers were elected for 1910: Dr. M. V. Del Valle, president; Dr. Francisco Ponte, vice-president; Dr. E. F. Ros, secretary; Dr.

FIG. 5.



Internal view of the upper plate.

FIG. 6.



Internal view of the lower plate.

cast gold inlays; the use of Weston's metal in casting; methods of successfully casting against porcelain; seamless and two-piece crowns; "Tartar Solvent," and porcelain jacket crowns.

After various discussions on the above demonstrations, the society unanimously voted thanks to The S. S. White Dental Manufacturing Co. for having so kindly sent a representative to this meeting, and in reply the representative of that

L. R. Noa, assistant secretary; Dr. J. Salgado, treasurer.

Executive Committee. For Arecibo—Dr. J. L. Casaldue. For Aguadilla—Dr. L. M. Villalon. For Mayaguez—Dr. B. Ramirez. For Ponce—Dr. J. P. Lamoutte. For Guayama—Dr. F. G. Bruno. For Humacao—Dr. A. Barreiro.

The motion was carried to hold the meeting for 1910 in Mayaguez, on the first Sunday in July.

THE DENTAL COSMOS

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Devoted to the Interests of the Profession.

EDITED BY

EDWARD C. KIRK, D.D.S., Sc.D.

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PHILADELPHIA, NOVEMBER 1909.

EDITORIAL DEPARTMENT.

SOME SIGNS OF THE TIMES.

DURING the eighteen years in which the editorial conduct of the DENTAL COSMOS has been under its present management the central purpose held constantly in view has been to assist in bringing about a clearer conception of the relations of the scientific to the practical in our professional work, to promulgate correct notions as to the meaning of these much-used although generally misused terms, and to cultivate and foster a respect for and belief in the scientific method as the only sure means of professional advancement. The task has not been an easy one, but as it has offered the only means by which the true interests of the dental profession could be best served, the plan and object have been consistently adhered to. In the pursuit of its ideal the DENTAL COSMOS has welcomed to its pages the reports of research work in all departments of dental interest as exemplifying the value of the scientific method. It has given an equal welcome to all expositions of the practical appli-

cation of dental science to the art of dentistry in all of its technical phases, and likewise to all dissertations which in an educational way tend to broaden the sphere of influence of the scientific ideal in our professional life.

The course here indicated has not escaped criticism—no course ever does. We have received much unsolicited advice as to what should be published and what should not, and we have occasionally had to deal with the extremist who seemed to feel that the publication of a scientific article which was confessedly beyond his particular grade of comprehension was in the nature of a personal insult directed at him individually.

Reference is made to these matters because they are representative of an attitude of mind which in the course of the past two decades has undergone extensive modification. Scientific dentistry is scarcely a generation old; perhaps even yet the appellation is a misnomer, and it might be closer to the truth to say that it is only within the past twenty-five years that the scientific method as a means to an end could gain a respectful hearing within the profession of dentistry. Previous to that period practically all of our achievement was the fruit of empiricism; the art of dentistry was but the materialization of manual skill minus a correct understanding of the principles involved—the “how” without the “why.” Gradually, however, an increasing interest in the methods and results of scientific investigation has been growing up within the dental profession, and this interest has reached the point where in very many directions the demand is being made for more definite information of a scientific character upon which to establish more efficient modes of practice.

Notwithstanding this encouraging development there still exists the type of mind which is constantly expressing its admiration for the practical and its lack of faith in the scientific, and it is this attitude of mind which, collectively speaking, either openly opposes all efforts at scientific advancement or covertly attempts to discredit the importance and value of scientific work by over-emphasizing the practical. The condition of antagonism here referred to is not by any means peculiar to the individuals composing the dental profession; it seems to be a human characteristic to resent any interference with the existing order of things, and when that order happens to be the level of belief to which

a man individually has attained, and which incidentally is for the time being the limit to his attainment, any attempt to disturb this state of mental equanimity by compelling the acceptance of a broader view almost necessarily awakens resentment and opposition. Hence it is that every age has stoned its prophets. The *vis inertia* of the human mind is in many cases so pronounced that the effort to overcome it requires so great an expenditure of effort upon the part of the individual so affected that he is either unable or unwilling to undertake the task. In spite, however, of this source of opposition to intellectual advancement the search for scientific truth still goes on, and just as certainly the opposition to scientific advancement which grows out of the conditions above referred to disintegrates before the line of scientific advancement. Throughout the whole field of the healing art the material evidences of this scientific progress are manifest, and the influence of this general progress upon the development of dentistry is equally evident.

There is one phase of this question which in its broader aspects needs serious consideration. So much has been done upon the art side of dentistry in the United States of America, so rapidly has one device followed another, so fruitful has been the exercise of that inventive genius which we are prone to regard as a characteristic of our people, that the attention not only of American dentists as a class, but of the whole world, has been concentrated upon our achievements in this direction, and this has developed in us a sort of national pride productive of a sense of satisfaction with our achievement which has tended to obscure that other factor in professional development which is at the foundation of all intelligent and successful practice, namely, the scientific ideal. We have been so blinded by the importance of the material things which we have accomplished that we have neglected to take account as fully as we should of the scientific basis of our work. We are so accustomed to think of the supremacy of American dentistry that we fail to take into serious consideration what is being done in other countries in the investigation of the science of dentistry. It is a matter of common experience in our American dental meetings to hear the practicality and ingenuity of the American dental practitioner lauded as something which gives him a superior position as compared with

the more scientific, or as he is sometimes called, more theoretical European practitioner. There has been a tendency to minimize the importance of the work of this more scientific or theoretical practitioner as compared with the achievements of his more practical American colleague. This attitude, apart from its questionable courtesy, needs to be examined somewhat closer as to its accuracy.

Even assuming that the facts are as here set forth, and we believe that they are correctly stated, what after all is to be the practical outcome of the two methods of professional activity? Those who keep in touch with the events which are the signs of the times in the progress of our professional work cannot fail to have noticed that the keen, unflagging interest which is manifested by a large proportion of European practitioners in the research for the scientific data upon which a successful practice can alone be based is working out in the course of time two things: First, it is eliminating from their modes of practice ineffective methods; it is dismissing from further consideration ideas which have been found to be incorrect or faulty, and is gradually establishing a technique in dental art which is more efficient and reliable because it is based upon ascertained fact. For example, the extirpation of the dental pulp and the treatment of infected pulp-canals is one of the fundamental procedures of dental practice which has occupied the attention of the dental profession the world over, at least since dentistry has been an organized profession. Based almost wholly upon empirical methods, root-canal treatment and filling has been carried out with varying degrees of success and failure, and while we have had a legion of methods and materials for that class of work, and an abundance of speculative theories to explain why we did or did not succeed in the application of these various procedures, no one has been able to say with scientific exactitude just why one method was better than another, or why we have succeeded when we did succeed, or conversely why we have failed when we have failed. This question has, however, been for some time the subject of careful and thorough investigation by an eminent German scientist whose report on this question is reviewed in the present issue, and for the first time in the history of dentistry the chaos of empiricism with reference to root-canal filling begins to show something like re-

duction to scientific order, growing out of which it must necessarily follow that a more precise and successful technique will result. And furthermore it is evident that such a technique would not have been possible without the preceding painstaking scientific investigation which led up to it. Similarly the spirit of scientific research is proceeding in many other directions, especially in Europe, from which we surmise that analogous results in the way of important technique in other operative procedures must follow.

With this spirit of investigation being cultivated to the extent it is in Europe and with a relatively less regard for these things among the dental profession in America, we are confronted with conditions which should lead us to seriously question how much longer we shall be justified in making for American dentistry the claim of supremacy which we have been in the habit of doing in the past. Already the reports coming back from the Fifth International Dental Congress in Berlin indicate that the impression in Europe is gaining ground that by reason of the rapid development of a sound operative technique based upon scientific principles which for so many years has been worked out by European practitioners, the supremacy of American dentistry in Europe is on the wane.

We are not prepared to pass judgment on this matter. We are, however, of the opinion, first, that the situation is sufficiently important, quite apart from any question of international pride, to arrest the attention of those who are concerned with the development of dentistry in our own country, and to arouse a greater activity of interest in all that will help to place the profession of dentistry in this country upon a sound scientific basis. This means not only renewed activity among those constituting the organized dental profession in this country by the promotion of research work, but also the stimulation of every effort which can be brought to bear upon the question of professional education so that better and more thorough training and facilities may be afforded to those who are naturally inclined to take up dental scientific research work.

These suggestions are made in the spirit of the policy of the DENTAL COSMOS, which from the first has been devoted to the best interests of the dental profession.

BIBLIOGRAPHICAL.

PRINZIPIEN EINER RATIONELLEN THERAPIE DER PULPAGANGRAEN UND IHRER H A E U F I G S T E N F O L G E Z U S T A E N D E . K L I N I S C H - B A K T E R I O L O G I S C H E U N T E R S U C H U N G E N Z U R P A T H O L O G I E U N D T H E R A P I E D E R F A U L E N Z A H N P U L P A . [PRINCIPLES OF A RATIONAL THERAPY OF GANGRENE OF THE PULP.] By Med. Univ. Dr. B. MAYRHOFER, Professor and Dean of the Dental Department, University of Innsbruck. Jena: Gustav Fischer, 1909.

In this voluminous treatise, which represents the results of painstaking and conscientious researches so characteristic of German investigators, Professor Mayrhofer delves into the field of the bacteriology of the infected root-canal, which, while the subject of frequent discussion and daily practice, has not received sufficiently exact and scientific investigation, professional bacteriologists—because of their lack of dental training—having paid no attention to this work. The author, on the basis of reports of histories and diagnoses of cases which alone fill 137 pages of the book, is endeavoring to build up a rational therapy of gangrene of the pulp; that is, a method based on observed facts and scientific principles, thus bringing uniformity into the various methods of treatment which rest merely on theories and unproved claims. According to the author, freedom from odor of a pulp-canal dressing is by no means a sign that a root-canal is sterile, but simply indicates that putrefaction has been interrupted, not that the

bacteria have been destroyed. All of his investigations have been made in teeth in the mouth, comprising 75 cases of simple gangrene—of which 51 were treated in single-rooted, 23 in multi-rooted teeth; 15 cases of incipient periostitis, 15 cases of acute purulent periostitis with abscess formation, 7 cases of chronic periostitis, and 40 cases of alveolar fistula, of which 27 were in single-rooted, 13 in multi-rooted teeth.

In the second chapter Mayrhofer treats of the freedom from odor of the fiber, lack of reaction in the tooth, and cicatrization of the orifice of the fistula in their relationship to sterility of the root-canal. Despite these symptoms, which in practice are generally considered as infallible signs of sterility of a root-canal, Mayrhofer has found numerous examples of the presence of streptococci, staphylococci, yeast-cells, and spores, which were able to develop, although in 108 cases the pulp-fiber was odorless, and in 55 cases still had retained the odor of the disinfectant used. Even when a fiber proved to be sterile, spores could be found in the canal. In 171 cases, in which the teeth had showed no signs of reaction within a year, and the fistulæ had healed completely, bacteria could be cultivated. Hence from the absence of clinical phenomena no conclusions can be drawn as to the condition prevailing in the interior of the tooth. Our inability to render the canals sterile explains the recurrence of periostitis even after most careful root-canal treatment. It is therefore imperative to deposit a lasting antiseptic

in the canal. In his chapter on the micro-organisms of the infected root-canals, the author distinguishes between infection of the root dentin and the apical foramen. Even the strongest bactericides do not produce sterilization, the micro-organisms growing in the dentinal tubules. Even in apparently sound dentin streptococci have been found. In teeth with mixed infection the streptococci have the greatest power of resistance, then follow the spores, the staphylococci, and last the yeast-cells. The author goes so far as to say that there is no gangrene without streptococci. Bacteria have invariably been found in the root-canal two weeks after the medicated fiber had been inserted, although the instruments used had been laid in carbolic acid for five hours and preserved in 60 per cent. alcohol, the cotton had been sterilized in cresol-formalin, and no bacteria had ever been found in the temporary cement filling itself. The source of reinfection must consequently lie in the teeth themselves. Besides abscessed root-apices and small remnants of infectious matter left in inaccessible parts of the canal, the author regards the bacteria present in the dentinal tubules in all cases of gangrene of the pulp as the main cause of pathogenic infection. These bacteria in the dentinal tubules are not reached by the antiseptic, and as soon as this disappears, a reinfection can take place. Hence it is useless to leave a temporary filling in a tooth for any length of time, since this only facilitates the multiplication of the bacteria before the insertion of the permanent filling. Since the streptococci can never be entirely removed, not even by the application of sulfuric acid or similar drugs that dissolve dentin, the old saying that "It does not matter what is put in, but

what is taken out" becomes untenable, and great importance is to be attributed to the filling material.

Mayrhofer then criticizes at length Buckley's method, attributing to it undeniable advantages, especially when the canal is cleaned mechanically and then flooded, yet as soon as the tricoresol formalin has evaporated, the bacteria grow again in the canal. Pastes last a little longer, yet the author has found bacteria in the zinc oxid of the paste, which after the evaporation of the disinfectant furnishes a favorable medium for the growth of bacteria. How the streptococci get into the pulps of apparently sound teeth cannot be demonstrated with absolute certainty. Yet the fact that infection of the pulp occurs in such teeth leads the author to assume that the streptococci which, as has been shown by Sieberth, can migrate through sound dentin, penetrate to the pulp. Streptococci require very little oxygen, many live even as anaerobia. Consequently the author considers it as very risky to leave a layer of soft dentin under a filling.

From the eighth chapter on, Mayrhofer draws practical conclusions as to the treatment of gangrene, which he divides into two parts: First, management of the contents of the canal, and second, management of the canal itself. After removing all carious substances he employs Schreier's sodium-potassium method—which has, however, nothing to do with disinfection. Almost all the disinfectants serve their purpose for a time, but none of them will produce lasting asepsis. It is of no use to leave the medicated cotton fiber in for days or even weeks, as complete sterilization is impossible. The filling material must be bacteria-proof, and must lie against the canal walls in the area of the orifices of the

dentinal tubules of the root up to close proximity with the apical foramen, for which purpose a very soft or fluid substance is required, stiff pastes, cement, wood plugs, gold foil, wire, gutta-percha points, and cotton all being unsatisfactory. The filling material must be lastingly antiseptic, but must not irritate. The author discards all ethereal oils and thymol, since they evaporate, and uses balsam of Peru (cf. our review in *DENTAL COSMOS*, January 1909, p. 137) for which he claims the following properties: (1) It works lastingly as an antiseptic; (2) it does not volatilize; (3) it is not resorbed in the root-canal; (4) it does not discolor the tooth; (5) it can easily be introduced; (6) if necessary, it can easily be removed, and (7) it has no irritant action on the tissues, so that even if it gets beyond the apical foramen no damage results. Balsam of Peru prevents putrefaction by enveloping the material, thus preventing air and bacteria from entering or re-entering the canal. After mechanically cleaning the root-canal, the author introduces fiber medicated with orthocresol for twenty-four hours. The balsam of Peru is injected into the canal with specially designed cannulæ, the canal having been enlarged with a pear-shaped bur. Any excess of the balsam is absorbed with cotton, and the cavity is closed with cement, gutta-percha, or amalgam.

The results of the clinical observation and bacteriological examination of practical cases treated with balsam of Peru are very favorable, only cases of technical and anatomical complications failing to respond to this treatment. The author advises to open all teeth displaying symptoms of periostitis, and to apply tincture of iodine only in order to remove remnants of inflammatory infiltration, the

balsam of Peru to be used only after all inflammatory phenomena have disappeared.

This somewhat lengthy discussion of this work may be justified by the fundamental importance inherent in the author's findings in regard to the theory and practice of the treatment of dental pulp-gangrene. R. H. R.

DIAGNOSTISCH-THERAPEUTISCHES TASCHENBUCH FÜR ZAHNÄRZTE. [POCKET MANUAL OF DENTAL DIAGNOSIS AND THERAPEUTICS.] By Dr. phil. H. CHR. GREVE, Bavarian Court Dentist, Munich. Fourth Edition. Frankfurt o/M: J. Rosenheim, 1909.

This little book, which is intended to furnish a collection of approved prescriptions and therapeutic suggestions for daily practice, offers in a concise and clear form a description of the pathologic phenomena of the teeth and the mouth in alphabetical order, giving special attention to differential diagnosis. The author has succeeded in giving brief information as to etiology, diagnosis, and therapy even of those oral diseases the nature of which is not yet fully recognized. The frequent citation of the highest authorities, both German and foreign, proves the book to be abreast of the latest progress in dental science. In an appendix, formulas for mouth-washes, tooth-powders, and tooth-pastes are cited, serving more the purpose of cosmetics than of therapeutics. Notes on local anesthetics and their dosage, on the treatment of intoxications, maximal doses, diagnostic symptoms, eruption of the teeth, comparative weights and measures, solubility of drugs, and an alphabetic index of remedies used in dental practice, with an epitome of their application, dosage, and form, render this pocket book an ever-ready

mentor for the busy practitioner. The interleaving of the pages leaves space for personal notes on innovations in therapeutics or differential diagnosis as may be gleaned from the periodical literature

and individual experience. Especially those dentists who know prescription-writing not to be their strong point will welcome this handy and yet strictly scientific aid.

R. H. R.

REVIEW OF CURRENT DENTAL LITERATURE.

[*Deutsche Zahnärztliche Wochenschrift*, Berlin, May 29, 1909.]

TECHNIQUE OF THE INJECTION OF LOCAL ANESTHETICS. BY DR. G. FISCHER, GREIFSWALD.

Although certain rules for the technique of injection of local anesthetics are indicated by the anatomical conditions of the maxillary bones and their nerve and blood supply, every practitioner and every dental school prefers a different method. On the basis of careful anatomical studies the author has contrived a system of local anesthesia.

In the maxilla, anesthesia of the molars is obtained by an injection from the buccal and palatal sides. The needle is inserted buccally above the second molar shortly below the mucous fold into the mucosa, so that it penetrates closely to the periosteum of the alveolar process, obliquely upward and backward to the maxillary tuberosity, and only after the needle has disappeared in the depth of the mucous membrane 1 ccm. of the anesthetic solution is discharged. On the palatal side the mucosa above the last molar forms a slight groove, in whose depth high up in the palatal roof the anterior palatine foramen is situated. In this groove the needle is inserted, slightly inclined toward the alveolar process, and $\frac{1}{4}$ to $\frac{1}{2}$ ccm. of the solution is injected, complete anesthesia of the posterior alveolar portion extending to the first molar ensuing. Larger quantities should not be used, owing to the rapid diffusion into the pharyngeal mucosa, which may produce intolerable pain on swallowing.

For anesthetizing the front teeth the injection is made in the canine fossa, thereby

obtunding the nervi alveolares submaxillares anteriores, and in the foramen incisivum, obtunding the nervus naso-palatinus. At the fossa canina the alveolar tissue is very tender, hastening the diffusion of the solution. The injection of the canine fossa is difficult for the beginner, and it is therefore recommended to palpate the infra-orbital border under which the infra-orbital foramen is situated, to compress it with the third finger of the left hand, while with the thumb of the same hand the lip is held upward. Then, about level with the apex of the root of the canine, the needle is inserted into the mucous fold close to the muscles of the lip, and pushed obliquely upward and slightly backward. When the needle in its direction toward the infra-orbital border has arrived under the compressing finger-tip, about 1 ccm. of the solution is deposited. On the palatal side the needle is inserted exactly in the middle of the papilla incisiva, and pushed in parallel to the direction of the incisors, and about $\frac{1}{4}$ to $\frac{1}{2}$ ccm. of the solution is deposited.

If the bicuspid alone are to be anesthetized, the needle is inserted buccally at the apex of the root of the canine shortly below the mucous fold and inclined horizontally backward, and immediately from the point of insertion 1 ccm. of the solution is injected by gradually pushing the needle forward on the surface of the facial bone. On the palatal side $\frac{1}{2}$ ccm. of the solution is deposited, the needle penetrating between the two bicuspid into the depth of the mucosa up to the apex of the root.

In individual teeth and roots in the maxilla the injection is made shortly above the papilla into the submucosa, the needle pene-

trating carefully to the periosteum. The needle is held in a horizontal direction, so that in advancing it maintains the same distance to the papilla. On the palatal side the injection is made along the root, advancing cautiously to the apex, where about half the quantity of solution used on the buccal side is deposited.

This technique, which always yields perfect success, is based upon the distribution of compact and spongiöse osseous substance at the alveolar border. Examination of numerous skulls showed that the alveolar septa are penetrated by small numerous canals. If the individual alveolar sockets are opened, it is seen that the sieve-like perforations decrease in number at the middle of the alveolus, becoming more numerous again at its base. The marginal alveolar border in the vicinity of the cervices of teeth behaves consequently like spongiöse osseous tissue, which is easily penetrable to isotonic solutions.

In order to render the insertion of the needle into the mucosa painless, the following method is recommended: The portion of the mucosa is painted with tincture of iodine, dried, and a small wad of cotton saturated with a 50 per cent. solution of novocain (novocain 10, aqua destillata 20) is laid on for from one to two minutes. The insertion is then painless, also the injection, if the liquid is introduced carefully and very slowly.

In the mandible, also, Dr. Fischer distinguishes between anesthesia of the front teeth and that of the posterior ones. In strong molars from 2 to 3 cm. are injected at the mandibular foramen, whereby the mandibular nerve or inferior alveolar nerve entering into the mandibular canal is anesthetized. With the index finger of the left hand the anterior portion of the base of the ascending ramus is palpated where two marked osseous ligaments—the anterior external (*linea obliqua*) and the posterior internal (*crista buccinatoria*)—are felt. Between these two, at the root of the ascending ramus, a shallow groove is found, which might be designated as the fossa retro-molaris. Over this the mucosa comes down slightly, designated by Braun as *trigonum retro-molares*. While firmly holding to this interior ligament with the edge of the finger-nail, the operator inserts the needle closely to the nail and the

osseous ridge, pushing it horizontally backward from the canine on the other side on the interior surface of the mandibular half to be anesthetized. After about 20 minutes in adults, and after from 10 to 15 minutes in children, every tooth, including the second bicuspid, is anesthetized.

In front teeth in the mandible the needle is introduced between the first bicuspid and canine upward closely to the mandibular bone, and immediately after insertion $\frac{1}{2}$ cm. of solution is injected. From $\frac{1}{2}$ to 1 cm. of the solution is also injected into the mental fossa, the needle penetrating at the mucous fold at the level of the root of the canine, the canine and the incisors on the same side becoming insensitive.

In order to anesthetize the bicuspids, it is often sufficient to inject at the mental foramen, which is reached by inserting the needle into the mucous fold between and above these teeth, 1 cm. being also deposited lingually between the two teeth, the needle penetrating parallel to the root.

In order to be absolutely sure in every case of mandibular anesthesia, 1 cm. of the solution is injected at the mandibular foramen, the front teeth being specially anesthetized by local injection, while in molars a greater quantity of solution is injected at the foramen mandibulare. Anesthesia of the mucosa is successful only in loose roots and in young jaws, the needle being introduced near the papilla, as in the maxilla.

For the diffusion of the anesthetic solution, the vascular and lymphatic system is important. A cat was injected with an isotonic solution of carmine as in local anesthesia, the color appearing in the whole area of the neighboring lymph system. The numerous lymphatic nodules of the jaw were profusely permeated with color. The pulps showed after eight minutes numerous particles of color in the vascular capillaries. While the coloring substance was noted in the perivascular lymph-vessels of the dentin and the pericementum, no traces were found in the pulp, contradicting Schweitzer's assumption of lymph-vessels in the pulp.

In the author's experience, extending over about 5000 injections, novocain-suprarenin has given perfect results with never any untoward sequelæ. The solution indicated is: Novocain 1, sodium chlorid 0.45, thymol 0.033,

aqua destillata 50, to each cem. of which, shortly before use, one drop of a 1:1000 synthetic solution of suprarenin is added.

Infiltration anesthesia in both jaws, which can be applied in patients from the fourth year of age on, leaves no after-pain, all effects disappearing in from two to three hours, and is indicated in periostitis, in all cases requiring anesthesia of several teeth, and in the painless preparation of carious teeth. Injections into the mucosa must always be made horizontally from the papilla; they have proved themselves most satisfactory in single teeth or loose roots.

[*Les Annales Dentaires*, Paris, July 1909.]

NOTE ON THE PATHOGENESIS OF DENTAL ROOT-CYSTS. BY PROFESSOR J. REDIER.

During several years of study of the microscopic lesions of chronic alveolo-dental arthritis of the apex, the author has removed the maxillaries during autopsy on a great number of middle-aged persons, and has found in all cases of chronic arthritis of the apex a neoplasm forming a globular tumor, apparently attached to the apex of the root and representing one of the following types:

- (1) Simple granuloma.
- (2) Granuloma with epithelial granulation.
- (3) Abscessed granuloma with simple wall or containing epithelial granulations.
- (4) Cystic granuloma with epithelial wall, the last being the most frequent.

From these observations Professor Redier arrives at the following conclusions: In a tooth the pulp of which has been infected as a result of penetrating caries or in consequence of traumatism, the infection is propagated through the root-canal, and gives rise to a localized chronic arthritis in the vicinity of the apex. Consequently there appears at this point an inflammatory neoformation, a simple granuloma or a granuloma with epithelial granulation which is the seat of a serous, seropurulent, or even more or less purulent exudate. This is discharged through the root-canal, or if this exit is not available, is retained and accumulated. As soon as there is sufficient suppuration, an artificial outlet is forced through the osseous tissue of the alveolus and the soft parts, as in ordinary abscess. If, however, the exudate is of small

quantity and contains only a small number of pus globules, if it is moreover circumscribed by one of those hood-shaped epithelial partitions—which Malassez has so well described—with the usual paradental epithelial proliferations, real encystment ensues. The granular tissue which is found outside the epithelial hood becomes organized, and after a certain time a regular cyst is produced, which ultimately, under the influence of ordinary causes, may become inflamed and suppurate like all cysts. If the small cyst which is thus formed should escape infection, which is rare but possible, it will gradually develop into a large cyst. This conception differs from that of Malassez, which has become classic, inasmuch as Malassez considers small cysts as having been formed originally at the expense of epithelial debris in consequence of an irritation of the surrounding area, while Redier regards them as accidental formations effected by an inflammatory neoplasm in consequence of granulation of the epithelial debris.

[*Zahnärztliche Rundschau*, Berlin, May 16, 1909.]

PORCELAIN FILLINGS. BY DR. FRITZSCHE, LEIPZIG.

After properly preparing the cavity, preferably in beaker shape, the filling is modeled in porcelain in the cavity with the desired edges and contours. If the porcelain mass is too hard, it is rendered more plastic by an addition of water; if too soft, it is passed through a flame for a moment. The model is removed, and in the cavity surface a pin is inserted so that after the removal of the pin the porcelain model shows a hole at the bottom. If in doing this the model has been distorted, it is once more introduced into the cavity and shaped up. The model is then dried, baked, and enameled. Drying takes only a few minutes, and is best done on an asbestos strip over the small flame of a Bunsen burner. For baking, the porcelain model is mounted on the pin and held over the sootless flame of a Bunsen burner until it is glowing red. Then, without any investment, the model is heated to white heat in the pointed flame for one minute. This flame is directed preferably against the surface of the inlay, in order to prevent the pin from burning and to thoroughly bake the surface. The

pin can also be coated at its upper third with very thin porcelain, thereby avoiding its being burned. If the pin should burn away, the porcelain inlay is cemented to a fire-clay slab with very thin porcelain and held in the pointed flame. The baked filling is somewhat smaller than the cavity, owing to shrinkage. This is counteracted to advantage by the inlay fitting very closely to the cavity margins. If the porcelain edge protrudes a little, it can easily be ground off. The baking of the inlay is important, yet in approximal and labial surfaces of anterior teeth the filling has to stand very little stress, and it suffices to thoroughly bake the surface. Imperfect marginal adaptation resulting from shrinkage of the porcelain is compensated by an additional porcelain layer. The baked inlay is fitted in the cavity, and very thinly mixed porcelain is painted with a hair brush over the surface and the margins. This thin mass partly enters the fine pores of the inlay and adheres in that way. When the additional layer is satisfactory, the inlay is removed from the cavity, dried, and baked on the pin as described.

Finally, the inlay seated in the cavity is painted with colored enamel, which is glazed over the Bunsen burner. In this way the filling is at once enameled and colored, and the enamel layer affords additionally accurate marginal adaptation. The inlay is set with very thinly mixed cement. Any desirable undercuts may be made in the porcelain model or cut into the inlay after baking. If it is desirable to have the cement set quickly, the inlay is heated over a small flame and then pressed into the cemented cavity. The cement will harden almost instantaneously. To insure a perfect fixation of the inlay, a thread may be wound and tied around the tooth and over the inlay, which will gently press the latter into its proper position. This thread also affords a good hold to the final wax cover. By the above method the cavity preparation and the completion of a porcelain inlay should not require more than one hour.

[*Les Annales Dentaires*, Paris, August 1909.]

IMMEDIATE REIMPLANTATION OF TEETH. BY L. CRUET.

The method of reimplantation as suggested by the author may be briefly summarized: By immediate reimplantation of teeth is

meant the extraction and almost immediate reimplantation into its alveolus of a tooth affected with acute periostitis, with or without congestion, with or without abscess. Immediately after the extraction the alveolus is curetted, and if an abscess is present it is opened and drained. If the extracted tooth is carious, it is thoroughly cleaned, the canals are emptied of their contents and sterilized, and the cavity, canals, and foramen are carefully filled. The reimplanting of the tooth into its alveolus is generally painless, no inflammatory reaction taking place. The consolidation of the tooth takes place within a week and is completed within three weeks, experience showing so far that reimplanted teeth last for seven years. During all the phases of the operation antiseptics are to be employed, such as sublimate, carbolic acid, hydrogen dioxid, pure or in combination. It is left to the operator's discretion to use cocain for the extraction. The general success of immediate reimplantation of teeth warrants it a place in everyday practice.

[*Archiv für Zahnheilkunde*, Berlin, June 1909.]

PYOCYANASIS AND ITS APPLICATION IN DENTISTRY. BY DR. A. LOHMANN.

Pyocyanasis, discovered by Emmerich and Loew, is the proteolytic enzyme of the bacillus pyocyaneus, and possesses the property of dissolving its own protoplasm and that of other bacteria. Emmerich has proved the bactericidal action of pyocyanasis on a great number of pathogenic bacteria, as well as its relative non-toxicity, which favorably distinguishes it from the destructive action of most disinfectants upon the tissue. Dr. Reich, dean of the dental department of the University of Marburg, also reports most favorable results. Pyocyanasis is a dark-greenish fluid of rather high specific gravity and peculiar jasmine-like odor; it is a sterile solution and withstands decomposition for over a year. It prevents bacteria from multiplying and producing toxins, and destroys them in a short time, dissolves membranous coating, cleanses ulcers and stimulates regeneration of tissue; it reduces the swelling of mucous membrane and corresponding glands, and favorably influences fever and the general state of health. In pyorrhea alveolaris, no matter to what general or local

causes it may be due, pyocyanasis has produced unexpectedly good results even in cases of considerable destruction of the alveolar process, loose teeth, and flow of pus. First, all tartar is carefully removed and the affected teeth are relieved from stress as much as possible. Very loose teeth are fixed by ligatures. The diseased areas are then repeatedly rinsed with a 3 per cent. solution of hydrogen dioxid, which is carefully washed off with tepid water from a syringe. The patient is requested to vigorously rinse his mouth, and the diseased areas are perfectly dried with hot air. Then by means of dropping tweezers, the pyocyanasis is introduced into the gingival pockets and forced down as deeply as possible with a blunt sound. The gingiva should not be lacerated, and the remedy is allowed to be absorbed for about five minutes. No further rinsing is permitted. In severe cases two treatments should be given during the first week, then one daily treatment. In some cases a cure was effected in two weeks, in others only after several weeks or months. Relapses have not been observed.

[*Les Annales Dentaires*, Paris, August 1909.]

REIMPLANTATION. BY DR. TORWEN, ST. PETERSBURG.

This résumé of practical experiences with reimplantation extending over twenty years and comprising 1300 successful cases seems noteworthy: Unless root-canal treatment and subsequent filling with cement will save a tooth, the reimplantation of any single-rooted or multi-rooted tooth is indicated, if it can be firmly held in place by a rubber plate which will prevent the displacement of the reimplanted tooth. The slightest movement, though imperceptible to the eye or to the patient's sensitivity, considerably counteracts the preservation of the tooth in its socket. The rubber plate is to be prepared before the reimplantation of the tooth. In order to avoid hemorrhage and an accumulation of blood-clot, which produces sensitivity, a tampon of sterilized cotton saturated with a 1:2000 solution of adrenalin is introduced in the alveolus. The rubber plate is worn for at least three weeks; in cases of completely degenerated alveoli patients may be obliged to wear it for two or three months. The author affirms that he has always met

with complete success, and has in many cases been able to put a single crown or even a prosthetic piece on a reimplanted root.

[*Berliner Zahnärztliche Halbmonatsschrift*, Berlin, July 20, 1909.]

DENTAL DISEASES IN THEIR RELATIONSHIP TO OCULAR DISEASES. BY DR. ADOLF GUTMANN.

Between the periosteum and the mucosa of the maxilla and the periosteum of the orbit a continuous network of lymphatic and venous vessels exists, both systems extending directly under the skin of the cheek. The alveolar veins communicate with those of the mucosa of the maxillary sinus, which in turn communicate with the outer and inner venous branches of the orbital fossæ. In the periosteum of the frontal surface of the maxilla a venous network exists, communicating with the vena ophthalmica facialis and through this with the ophthalmica superior and inferior. According to Farinaud, fine lymphatic bone-canal exist as remnants of the rudiments of the permanent teeth, which run from the alveolus to the lacrymal sinus and the inferior orbital border. This demonstrates the different ways of propagation of inflammatory processes from the teeth to the eyes, which may be supplemented by way of continuity, in that an open alveolus may lead to suppuration of the antrum of Highmore, which may involve the orbit by necrosis of the inferior orbital wall. Other dental diseases that may involve the eyes are dental caries, alveolar periostitis, dental empyema of the antrum of Highmore, dental fistula, and actinomycosis. Ocular diseases of dental origin are acute conjunctivitis, edema of the lid, retrobulbar orbital phlegmon, neuritis of the optic nerve, diffuse orbital phlegmon with orbital venous thrombosis, and metastatic irido-chorioiditis.

Another method of propagation is that by way of reflex. First, sensitive reflex neuroses have to be distinguished, such as ciliary neuralgia caused by dental caries and irritations of the sensory branches of the conjunctiva. On the other hand, ocular diseases such as glaucoma may produce severe neuralgia in sound teeth by way of reflex. Vaso-motor reflex neuroses caused by dental disease are hyperemia of the conjunctiva and edema of the lids. The motor reflex neuroses are very

important, such as non-coördinate contractions of the eye muscles and concomitant strabismus during dentition, which yield to scarification of the gingiva or spontaneously after eruption of the teeth. During dentition, rhythmical movements of the eye—nystagmus—are frequently observed. Lamellar cataract, according to Schmidt-Rimpler, is produced by the cramps associated with difficult dentition in rachitic children, which in a reflex way causes disturbances in the blood supply of the corpus ciliare by alternating irritation and relaxation of the vaso-constrictor and dilator muscles, and consequently interfere with the nutrition of the lens,

which depends upon the vessels of the ciliary body. Paralyzed accommodation may also be connected with dental disease and improve upon removal of the diseased tooth. Of diagnostic value are Hutchinson's teeth—which are frequently observed together with parenchymatous keratitis, and are a certain symptom of hereditary syphilis—and, further, pitted, jagged rachitic teeth, which are generally noted in conjunction with lamellar cataract. The circular discoloration or circular caries of the neck of the tooth typical in tuberculosis may also be used as an easily recognized diagnostic aid in the etiology of ocular disease.

PERISCOPE.

Sterilization of Wax.—Wax may be sterilized and rendered fit for further use by boiling it for thirty-five minutes in a large pan of water containing one ounce of oxalic acid to the quart.—THOMAS FLETCHER, *Pacific Dental Gazette*.

Convenient Crucible Tongs.—Convenient crucible tongs that are perfect for handling hot crucibles, molds, etc., can be easily made from any spring wire. Bend your wire to the shape indicated [*i.e.* similar to that of the stout wire used by housewives for tightening or releasing the screw lids of preserve jars], making the twist, or spiral, a little larger than the crucible. If you will take the trouble to make one, you will be so well pleased that it will become a permanent fixture in your office.—C. JENNISON PALMER, *Dental Summary*.

Preparation of Gold.—It is very important to have gold for casting free from all foreign matter before placing it in the crucible to be cast. If we have been particular with the treatment of the wax pattern previous to this time, and it is a perfect counterpart of our cavity, very little burnishing of the margins is necessary. Consequently it is possible to use our scrap plate rather than pure gold. If we have been reasonably careful with our scrap and have kept it free from platinum or silver, the color is not bad for fillings, and it has the advantage of retaining its shape better than pure gold.

If scrap is used it should first be boiled in

50 per cent. nitric acid to remove any base metals that may be present; then wash it and place it upon a charcoal block, and melt. While the mass is in a molten condition, it should be sprinkled with ammonium chlorid (sal ammoniac). This should be repeated until the gold ripples like water. This may be remelted in a carbon crucible and cast into ingots for use, or used as it is.

If we are melting our gold in a crucible formed in the investment, very little flux, if any, should be used, as there is danger of its closing the opening into the mold, thus preventing a perfect cast, if the gold goes down at all. The importance of having gold in perfect condition for casting must not be overlooked.—A. W. STARBUCK, *Dental Summary*.

Sterilizing Dental Instruments.—Hypodermic needles must be heated to a glow, hypodermic syringes boiled, also impression trays and almost all new instruments. To save the nickel coating, the instruments are boiled for from ten to fifteen minutes in distilled water. If a 2 per cent. solution of soda and a temperature of only from 60 to 70° C. for more delicate instruments is used, the time of immersion should be from twenty to thirty minutes. Every rinsing glass immediately after use should be placed in a 1:1000 solution of sublimate, with the rim downward. All other instruments and stones, after having been carefully cleaned mechanically, should be laid for an hour or more in a 5 per cent. solution of lysol. For this solution distilled or freshly

boiled water is used. The straight handpiece is closed in front by a rubber stopper; the right-angle one, which cannot be protected against lysol entering, should be taken apart every two weeks. Even if that is done less frequently, the lysol will do no harm. Before being used all instruments may be dipped into a 1 per cent. solution of lysol, also the mouth mirror in order to prevent coating. The same solution may be applied to the field of operation before surgical treatment. After removing tartar, the gingival pockets can be irrigated with a 3 per cent. solution of boric acid. The odor of lysol is not agreeable, yet no other means of sterilization has the same excellent qualities.—A. SENN, *Schweizerische Vierteljahrsschrift für Zahnheilkunde*.

The Tonsils and the Teeth.—When a tonsil is normal, infection from the external surface is rare. Secondary infection through the lymph channels is the usual source. There are four periods of molar eruptions, with some variations in time, when the tonsils may enlarge without infection or inflammation, viz, at two years, six years, twelve years, and seventeen years. Tonsils, though slightly enlarged, when not infected return to normal with the complete eruption of the teeth. Diseased teeth are a prolific source of enlargement of the glands through proximity of membranes, either directly by infection, or by toxins. In the treatment of the tonsil by the specialist, may we not include as a routine the observation as to carious teeth and a recognition of these four periods of eruption coincident with slight enlargement?—G. H. WRIGHT, *Boston Med. and Surg. Journ.*

Taking Impressions for a Denture in a Mouth Where a Denture has been Worn.—Sometimes patients wearing vulcanite dentures present for the impressions for other upper dentures. If the impression be taken while the old denture is being worn, the new denture will doubtless be loose and less satisfactory than it should be.

Much better results will be obtained if the patient avoids wearing the old denture for twenty-four hours before the impression is taken. When a vulcanite denture is worn, the membrane of the mouth thickens. It remains thick as long as the plate is worn. In many cases leaving the plate out for twenty-four hours will allow the membrane to return to nearly normal condition. If the impression be taken with the membrane normal, the model will be smaller and the new plate made over will fit tighter and better. This is especially true of upper dentures.—GEORGE W. CLAPP, *Dental Digest*.

Surgical Treatment of Trifacial Neuralgia.—The treatment of trifacial neuralgia by surgical procedure should not be hastily resorted to. Let it be done only after a careful diagnosis has been made. Moreover, internal medication should be employed when indicated. If the diagnosis points out a local irritant as the cause, this irritant should be removed. I do not mean that the teeth should be removed, but the diseases of the teeth, if any, should be cured, thus removing the source of irritation. The general extraction of teeth has too often been resorted to without a knowledge as to whether they were abnormal or otherwise. They have been extracted in the hope that by some chance the patient would be relieved. In most instances, extraction of teeth for the treatment of neuralgia is not only useless, but the injury to the patient is irreparable. The time is past when the indiscriminate extraction of teeth can be resorted to with the vague idea that a pain can be arrested, the cause of which is not understood. There are but few incurable diseases of the teeth.—T. W. BROPHY, *Dental Brief*.

Condensing Gold with the Hand Mallet.—Of the different kinds of force in use for the condensation of gold, none is better than the hand mallet wielded by a skilled assistant. The advantage of this method seems to lie in the combination of two forces simultaneously—hand pressure by the operator and mallet force by the assistant. The tooth is pressed to a firm position where the periodontal membrane is tense, so that the blow is better tolerated by the patient and at the same time the gold is held in the exact position where condensation is needed. Gold may also be thoroughly condensed by the automatic, electric, or mechanical mallet, or by hand pressure, but whatever method is adopted great care should be exercised that the condensation be thorough and complete at all stages of the work. The contact point in approximal cavities should always receive the most careful attention. The gold should be condensed against the surface of the approximating tooth at this point in the same manner as against cavity walls. Sufficient separation should have been gained to admit of polishing the contact point without removing too much of the gold, and thereby destroying the normal relation of the teeth at this point. It is well to test the work at the cavo-surface angle by hand pressure, using a small plugger to make sure that perfect adaptation has been secured.—J. M. TENCH, *Dental Forum*.

HINTS, QUERIES, AND COMMENTS.

UTILIZING BROKEN PINS IN CROWNS.

Most dentists find a broken pin that is left in the root very troublesome to repair, as it is generally a hard task to dislodge it. The following method may be used to advantage in overcoming this difficulty:

The patient, a young man, had worn an upper left lateral Darby crown for a number of years, until it broke off, leaving the root decayed underneath, the end of the pin pro-

truding from the root $\frac{1}{4}$ of an inch below the gum line, as shown in Fig. 1. The following procedure of repair was adopted: The carious portion is ground away and the pulp-canal enlarged so that it is considerably wider than the diameter of the pin. Care must be taken not to enlarge the root-canal too much, as there is danger of subsequent splitting of the root. With a fine fissure bur a ditch is ground around the end of the pin, not more than $\frac{1}{8}$ of an inch in depth. If the pin is very thick, its diameter may be reduced with the same bur. Soft inlay wax is pressed well up into the root, chilled, and removed. If the wax impression does not show the outline of the ditch completely,

add a drop of wax at the end and insert again. Trim the wax impression so as to reproduce the base of a Darby crown, heat the sprue wire, insert it into the wax impression, chill with cold water, and remove. The impression should represent a small wax tube. Into this tube a small piece of lead from a pencil is inserted in the following manner: The point of a lead pencil is shaped until it properly fits into the wax tube. It is then broken off the pencil, held in pliers and passed over the alcohol flame, and inserted into

FIG. 1.

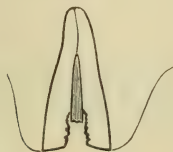


FIG. 2.

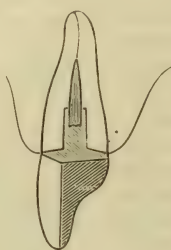
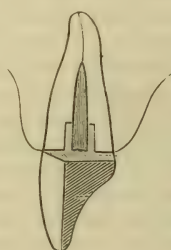


FIG. 3.



truding from the root $\frac{1}{4}$ of an inch below the gum line, as shown in Fig. 1. The following procedure of repair was adopted: The carious portion is ground away and the pulp-canal enlarged so that it is considerably wider than the diameter of the pin. Care must be taken not to enlarge the root-canal too much, as there is danger of subsequent splitting of the root. With a fine fissure bur a ditch is ground around the end of the pin, not more than $\frac{1}{8}$ of an inch in depth. If the pin is very thick, its diameter may be reduced with the same bur. Soft inlay wax is pressed well up into the root, chilled, and removed. If the wax impression does not show the outline of the ditch completely,

the wax is invested, and a casting made of 22-k gold. (Fig. 2.) After casting, the lead is ground out of the tube with a fine bur, and if the casting does not go up into place easily, the tube may be slightly enlarged. The facing is then prepared and soldered to the casting in the usual way. Before being cemented into place with copper oxyphosphate cement, the casting should be serrated. If the root is not carious and is level with the gum line, and the pin is broken off at the surface of the root, the ditch may be made much deeper and slightly wider, as shown in Fig. 3.

BERNARD FISCHLER, D.D.S.

Brooklyn, N. Y.

OBITUARY.

DR. JOSEPH WM. WASSALL.

DIED, by accidental drowning in Lake Michigan, September 18, 1909, JOSEPH WILLIAM WASSALL, D.D.S., M.D., Chicago, Ill., in his fifty-second year.

Dr. Joseph W. Wassall, who resided in Lake Forest and maintained dental offices in Chicago, was lost overboard from the schooner "Mistral" during a heavy storm six miles off Racine, Wis., September 18, 1909, while on a pleasure trip to Milwaukee.

The deceased was born in Blockley, England, on February 8, 1858, being the only son of a minister. When he was but four years of age he began his schooling at a private school in his native town. In 1864 his father brought his family to America, in order that the children might be educated in this country. They came first to Dorchester, near Boston, but remained there only a few months. In the effort to better himself, Rev. Wassall moved about considerably, consequently his children's early education was obtained in various schools, the first being a small grammar school at Dorchester Heights. Then they spent two years at Cape Cod, Mass., afterward removing to Newburyport, Mass., where they remained for several years; here the children gained some of their best school training. Then, removing to Wisconsin, after spending two years at Mazomanie they moved to Galena, where Joseph finally finished his grammar-school education.

When he was about sixteen years of age he entered the office of Dr. Geo. O. Howard in Galena and worked with him for two years, gaining thus his first knowledge of dentistry. In 1876 he entered the University of Michigan at Ann Arbor. After being graduated he worked in Dr. Howard's office for two more years.

He first engaged in practice for himself in 1878, in Darlington, Wis., and then, after a short time, in Mineral Point. In 1881 he went to Chicago, where he bought the office of Dr. Howard, who had died, and thence

started his successful Chicago career at 103 State st. While practicing there he attended lectures at the Physicians' and Surgeons' College, and in a few years received his M.D. degree.

His next office was at the corner of Dearborn and Chicago aves., where he practiced for seven or eight years.

In 1890, Dr. Wassall married Miss Grace Runnion Grosby, famous for her accomplishments in music and for her beauty. Two children were born to them—a daughter, Ellen, now fifteen years old, and a son, Joseph, now seven years old. In 1906 Dr. Wassall built a very attractive home in Lake Forest, which he occupied until his demise.

Dr. Wassall was an active member of the National Dental Association, the Illinois State Dental Society, the Chicago Odontological Society, and the Chicago Odontographic Society.

The tragic ending of Dr. Wassall's brilliant career has cast deep sadness over his many and devoted friends.

DR. FREDERICK H. LUNT.

DIED, at Rochester, N. H., August 26, 1909, of general paralysis, following a nervous shock, FREDERICK H. LUNT, D.D.S., in his fifty-ninth year.

Dr. Frederick H. Lunt, one of the most widely known professional men of New Hampshire, died at his home on Academy st., Rochester, N. H., after having been affected by a paralytic stroke at his dental office. Dr. Lunt was born at Durham, Me., August 1, 1851, on a farm, where he passed his boyhood, obtaining his early education in the country schools and at the academy in the neighboring town of Kent's Hill. In 1874 he entered the dental pupilage of Dr. Servance, South Berwick, Me., and after working for some time in dental offices, registered at the Philadelphia Dental College, whence he was graduated with the D.D.S. degree in 1875.

After graduation, Dr. Lunt began to practice independently at South Berwick, Me., and soon removed to Rochester, where he had been practicing for over thirty years. He built up a reputation as a dentist not second to that of any practitioner in New Hampshire. He applied himself most diligently, adopted all the latest improvements, and was highly respected both as a dentist and a man. An industrious reader, he was well informed on many topics, was imbued with civic spirit, and of unimpeachable integrity.

Shortly before moving to Rochester, Dr. Lunt married Hannah M. Stacey, who together with a son, Wilbur T., a dentist, survives him.

Dr. Lunt was a member of the New Hampshire Dental Society, the Northeastern Dental Society, and an honorary member of the Massachusetts Dental Society. For five years he was a member of the New Hampshire State Board of Registration, over which body he presided for three years, also a member of the board of education of Rochester from 1886 to 1888. He belonged to Humane Lodge, A. F. and A. M., of Rochester.

Funeral services were held at Dr. Lunt's residence, the Masons attending in a body.

DR. ALBERT FRANCIS MONROE.

DIED, at Flint, Mich., August 25, 1909, at his residence, 511 Detroit st., ALBERT FRANCIS MONROE, D.D.S., in his forty-first year.

The death of Dr. Albert Francis Monroe, who had been ill for several months, occurred on August 25th, at Flint, Mich.

Albert Francis Monroe was born in Flint in August 1868, and when a child went with his parents to a farm near Mt. Morris. He spent his boyhood on the farm, attending the Flint high school, and being graduated as president of the class in 1889. He then entered the dental department of the University of Michigan, from which he was graduated in 1894. He was also a graduate of the Angle School of Orthodontia, St. Louis, Mo.

In April 1898, Dr. Monroe was united in marriage to Miss Harriet M. Childs, who with their three sons, Donald, David, and Douglas,

survives him. From 1894 he had very successfully practiced dentistry in Flint.

Dr. Monroe was of genial and companionable nature, with a happy optimism that went far toward sustaining him throughout his protracted and trying illness. His cheerful smile and hearty word of greeting will be missed in the circles in which he moved, and among the host of friends and acquaintances the announcement of his demise was received with feelings of deepest regret.

Dr. Monroe was a member of the Genesee Valley Commandery, Knights Templars, and of Flint Lodge No. 222, B. P. O. Elks.

Interment was made at Glenwood cemetery, the Knights Templars being in charge of the obsequies.

DR. CHARLES FREEMAN FISKE.

DIED, at the home of his daughter, Mrs. Josephine Blodgett, at Lexington, Mass., September 19, 1909, of cancer, Dr. CHARLES FREEMAN FISKE, in his seventy-seventh year.

Death has claimed Dr. Charles Freeman Fiske, for more than forty years a prominent dentist in Milford, N. H.

Dr. Fiske was born at Temple, N. H., December 2, 1832. He attended school at Temple, and afterward entered Appleton Academy at New Ipswich. He learned the dental profession with the late Dr. Jeremiah Fiske of Clinton, Mass., and with Dr. Thresher of Boston, and afterward practiced at Marlboro and Clinton. He began his practice at Milford, N. H., in 1868, continuing until July 1908.

In November 1862 Dr. Fiske entered the army, serving as a hospital steward, and was stationed at Washington and at Alexandria, Va.

On November 24, 1863, at Cambridge, Mass., he married Emma S. Bailey, who died in Milford in 1894, leaving three children, of whom two survive, Mrs. Josephine Blodgett of Lexington, Mass., and Dr. Henry M. Fiske of Milford.

Dr. Fiske was a charter member of the Benevolent Lodge of Masons, also of the Chapter, and a member of the O. W. Lull G. A. R. post.

LEGAL DECISIONS.

[A DECISION has recently been rendered in the United States Circuit Court in New York upholding Dr. Edward H. Angle's patent for his regulating appliance. Owing to the interest taken by the profession in Dr. Angle's system of orthodontia, it is believed that this decision is of sufficient general interest to be here reprinted. The suit was brought by the E. H. Angle Regulating Appliance Company against Julius Aderer, a dealer in New York city; and after a consideration of testimony offered by both sides, Judge Hough rendered the following decision, which resulted in a decree restraining the defendant from further infringement, and awarding an accounting of damages and profits. The decision is interesting as a clear and careful definition of Dr. Angle's invention, so far as it relates to the telescoping friction sleeve which is employed in connection with the adjusting nuts upon his appliance.]

Decision.

HOUGH, D. J.:

COMPLAINANTS are respectively the owners of and the sole licensees under Patent 626,476, issued to Dr. Angle for a "tooth regulating device." The patentee is admittedly well

represented by Figs. 1 and 2 below reproduced.

Fig. 1 represents an "artificial arch" fastened outside of the teeth on either jaw by applying rings (3) to molar teeth on the right and left sides of the mouth respectively,

FIG. 1.

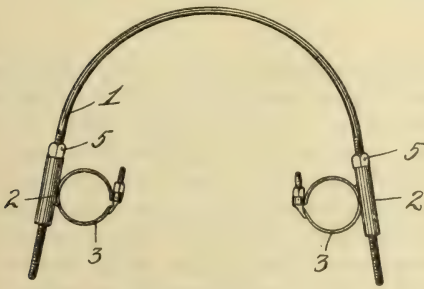


FIG. 2.



known to be skilled in the art or science of dentistry, and particularly in that department thereof which seeks to correct by mechanical devices teeth badly placed in the human jaw. This branch of dental science has been termed in argument "Orthodontia." When Dr. Angle applied for his patent there were known to the art devices sufficiently

and adjusting the arch near to and outside the intervening teeth. Obviously this arch, being composed of metal possessing resilience, is under some tension, and this tension may be increased or diminished and generally regulated by the nuts (5), which, operating upon the screw-thread on which they turn, may be used to advance or retract the metal arch as may be desired, and thereby to apply power to any tooth or teeth appropriately fastened to the arch itself by easily conceivable bands or "ligations."

Fig. 2 represents a means of applying power to a single tooth, by fastening as before a ring (6) to a molar, and adjusting the "fish-

tail" end against the tooth intended to be moved, and then regulating that power as before by the operation of the nut (5) upon the screw-thread.

The patentee observed that not only did the misplaced teeth move (as was desired), but the molars used as anchors were not themselves absolutely rigid in the jaw, with the result that the adjusting nuts (5) would remain where set, as long as a tension or pressure was maintained upon them. Whenever that tension was relieved by tooth movement, the "adjusting nuts were liable to be accidentally moved under the engagement therewith of the tongue or lips of the wearer." It is the intention of the dental operator that the patient wearing one of these devices should return to him from time to time to have the nuts adjusted and to re-establish the proper tension upon the teeth. But it was very desirable not to facilitate a slackening of the entire contrivance by tongue or lip movement upon the nuts in question.

Dr. Angle therefore obtained this patent for a device which is sufficiently shown by the figure reproduced below.

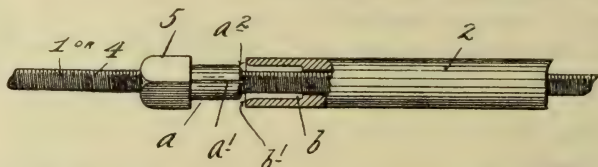
split it must "be made of a size to afford a close fit with the anchor tube."

This unsplit form is not preferred by the patentee, but it was admitted at the argument that it is the form which has passed into commercial use.

It is obvious that this device introduces a difficulty or retardation in the movement of the nut upon the screw-thread which is entirely independent of the screw action. The amount of that difficulty will depend upon the amount of friction existing at any given time in the friction sleeve. This friction will arise either from the spring action of the friction sleeve when split and pressed into the counter-bore, or it will depend merely upon the close adjustment of parts, as when the sleeve is not split but operates just as one portion of a telescope does upon the other.

The usual form of this device is the arch first above represented; the straight jack-screw appears to be less common. In the arch form it is evident that friction in the friction sleeve is increased by the tension of the arch, so that though the friction sleeve and the counter-bore may fit quite loosely

FIG. 3.



This figure exhibits the screw-thread of the device first above pictured, a nut (5) as before, one of the anchor tubes (2), whose positions on the screw-thread are regulated by the nut (5). But the two nuts, instead of being of the ordinary form, are provided with the "threadless extension" (a) which fits into the recess or counter-bore (b). In operation the extension (a) by insertion into the recess or counter-bore (b) forms what the patentee calls a "friction sleeve," in telescopic and frictional engagement with the counter-bored anchor tube (2).

The application shows two forms of this friction sleeve, one as in the figure last above reproduced with the sleeve split axially (a¹), and another form in which it is not split. He points out that when the sleeve is not

when the apparatus is not in use, the desired result will be attained when it is in use by the tension of the arch when fitted to the jaw. This result is not set forth and is not claimed in the patent, but the form of apparatus which renders it possible is shown, and means by which the successful result is secured are disclosed;—for which reasons it seems to me that the patentee is entitled to whatever benefit or advantage may accrue from this characteristic of his patented device, although not by him specifically set forth in his application. (*Van Epps vs. United Box Board & Paper Co.*, 143 Fed. Rep., 869.)

The first claim of this patent is as follows:

"1. In a tooth regulator having extensible

parts, an adjusting-nut working on one and reacting against the other of said parts, which nut has an abrupt shoulder that resists the end thrusts or strains, and is provided with a friction sleeve or section that puts the said nut under a friction or tension against rotation, independently of the end strains on the said nut, substantially as described."

The second (and only other) claim specifically covers the axial split above referred to.

It is admitted that the novelty of this invention rests only in the friction sleeve securing the nut against accidental rotation under slight pressure. As applied to a tooth-regulating appliance it is not denied that the invention is patentable unless anticipated.

It is matter of common knowledge that this branch of dentistry has recently made great advances, and it appears to me from the testimony herein that such advances are quite largely due to regulating devices such as this. The apparatus sold by defendant differs from that of the complainants solely in this, that whereas complainants' apparatus, as shown by the diagrams above reproduced, have a cylindrical friction sleeve, or one at all events cylindrical before a spring action is produced by compression of the split portions of the sleeve, the defendant's appliance possesses a

friction extension of the nut which is obviously slightly conical and whose counter-bore is split.

Whether the friction sleeve or the counter-bore be split is unimportant; the intent of either splitting is to produce a spring action, and defendant cannot escape infringement (nor has he sought to) by this change alone.

The defense, therefore, rests upon the proposition that defendant's conical sleeve is no more than a part of a "jam nut"; that jam nuts were well known before this patent, and therefore the defendant has a right to do what he has done.

* * * * *

[A discussion of an earlier British patent for improvements in lock nuts is here omitted.]

* * * * *

An examination of defendant's device, therefore, convinces me, that his is not a "jam nut," and that it is a colorable imitation of complainant's mechanism. His conoidal form is just a sufficient departure from a true cylinder to encourage a defense in a patent suit, but not a sufficient departure to produce Angle's result by any other method or in any other manner than that disclosed in Angle's application for his patent.

For these reasons the complainants are awarded a decree as prayed for.

SOCIETY NOTES AND ANNOUNCEMENTS.

NATIONAL DENTAL ASSOCIATION.

EXECUTIVE COUNCIL.

A MEETING of the Executive Council of the National Dental Association will be held at the Hotel Hollanden, Cleveland, Ohio, at 10 o'clock A.M., Saturday, November 6, 1909, for the appointment of officers of Sections and the usual committees, and the consideration of such other matters as may properly come before it.

Members of the association having any business to present are requested to attend this meeting.

BURTON LEE THORPE, *President*,
CHARLES S. BUTLER, *Sec'y*.

DR. GREENE VARDIMAN BLACK TO BE HONORED.

THE Chicago Odontographic Society desires to inform the dental profession that the association is to give a testimonial banquet in honor of Dr. Greene Vardiman Black, in the city of Chicago, during the last week of January 1910.

WM. H. G. LOGAN, *President*,
FRANK H. ZINN, *Sec'y*.

ODONTOGRAPHIC SOCIETY OF WEST PHILADELPHIA.

THE next meeting of the Odontographic Society of West Philadelphia will be held Monday, November 1, 1909, at 8 P.M., in the amphitheater of Dental Hall, University of Pennsylvania. At this meeting J. Howard Rhoads, of the Philadelphia Law School, at Temple University, will read a paper on "Dental Jurisprudence."

R. R. PARKS, *Sec'y*.

OHIO STATE DENTAL SOCIETY.

THE forty-fourth annual meeting of the Ohio State Dental Society, to be held in Columbus on December 7 to 9, 1909, promises to

be one of the very best in the history of this society. The program contains the names of such men as Drs. M. L. Rhein, I. N. Broomell, Marcus Ward, C. P. Pruyn, and Sidney Rauh of Cincinnati. The president, Dr. W. H. Whitslar, will give a stereopticon lecture on Tuesday evening on "The Human Hand." Dr. Whitslar has talked on this subject elsewhere, and is a known authority on palmistry.

The clinic program is the longest in the history of the society and will be instructive to all. The Arrangements Committee will provide a social feature for the entertainment of the members and guests, giving all an opportunity to become better acquainted.

Many new members have been added through the organization of component societies. Let every member come and bring a friend. A royal welcome and good time await you.

F. R. CHAPMAN, *Sec'y*,
Columbus, Ohio.

MARYLAND BOARD OF EXAMINERS.

THE Maryland Board of Dental Examiners will meet for examination of candidates for certificates November 10 and 11, 1909, at the Baltimore College of Dental Surgery, Baltimore, at 9 A.M. For application blanks and further information apply to

F. F. DREW, *Sec'y*,
701 N. Howard st., Baltimore, Md.

ARKANSAS BOARD OF EXAMINERS.

THE next meeting of the Arkansas Board of Dental Examiners will be held November 29 and 30, 1909, in Little Rock.

All applicants are required to pass an examination in order to obtain a certificate to practice in this state. No temporary permits. Examination fee, \$15.00.

A. T. McMILLIN, *Sec'y*,
111 E. 5th st., Little Rock, Ark.

ARIZONA BOARD OF EXAMINERS.

THE next meeting of the Arizona Board of Dental Examiners will be held in Phenix, November 15, 16, and 17, 1909. The fee of twenty-five dollars must be in the hands of the secretary twenty days before the date of the meeting.

For further information address

J. HARVEY BLAIN, *Sec'y*,
Box 524, Prescott, Ariz.

NEBRASKA BOARD OF EXAMINERS.

THE next regular meeting of the Nebraska Dental Board for the examination of applicants for license to practice dentistry in Nebraska will be held in Lincoln, beginning November 15th, at 9 A.M. All applications must be in the hands of the secretary by November 8th.

H. C. BROCK, *Sec'y*,
North Platte, Neb.

DENTAL COMMISSIONERS OF CONNECTICUT.

THE Dental Commissioners of the State of Connecticut hereby give notice that they will meet at Hartford on Wednesday, Thursday, and Friday, November 17, 18, and 19, 1909, to examine applicants for license to practice dentistry. Application blanks, rules, etc., will be forwarded by the recorder upon request.

By order of the Commission.

GILBERT M. GRISWOLD, *Recorder*,
783 Main st., Hartford, Conn.

ILLINOIS BOARD OF EXAMINERS.

THE annual meeting of the Illinois State Board of Dental Examiners for the examination of applicants for a license to practice dentistry in the state of Illinois will be held in Chicago at the Dental Department of the University of Illinois, corner Honore and Harrison sts., beginning Monday, November 8, 1909, at 9 A.M.

Candidates will be furnished with proper blanks and such other information as is necessary on application to the secretary. All applications must be filed with the secretary five days prior to date of examination. The

examination fee is twenty dollars, with an additional fee of five dollars for a license.

T. A. BROADBENT, *Sec'y*,
705 Venetian Bldg., Chicago, Ill.

CALIFORNIA BOARD OF EXAMINERS.

THE next meeting of the Board of Dental Examiners of California will be held in San Francisco, beginning on December 9, 1909. This meeting is for the purpose of examining applicants for licenses to practice dentistry in this state. Applications for same must be filed with the secretary ten days before the examination. The examination fee of twenty-five dollars and the credentials must accompany the application.

C. A. HERRICK, *Sec'y*,
San Francisco, Cal.

KANSAS BOARD OF EXAMINERS.

THE Kansas State Board of Dental Examiners will hold a meeting, for the examination of candidates for license to practice dentistry in Kansas, in Topeka, beginning December 7, 1909, at 9 A.M. For blanks or other information write to the secretary,

F. O. HETRICK, Ottawa, Kans.

RHODE ISLAND BOARD OF REGISTRATION.

THE Rhode Island Board of Registration in Dentistry will meet for the examination of candidates at the State-house, Providence, R. I., Tuesday, Wednesday, and Thursday, December 28, 29, and 30, 1909. Application blanks and particulars may be obtained from

H. L. GRANT, *Sec'y*,
1025 Banigan Bldg., Providence, R. I.

NEW HAMPSHIRE BOARD OF REGISTRATION.

THE next meeting of the New Hampshire Board of Registration in Dentistry, for examination, will be held at Masonic Banquet Hall, Manchester, N. H., December 7, 8, and 9, 1909.

No special examinations. All persons must become registered before beginning practice.

A. J. SAWYER, *Sec'y*,
Manchester, N. H.

NEW JERSEY BOARD OF REGISTRATION.

THE New Jersey State Board of Registration and Examination in Dentistry will hold its semi-annual meeting in the Assembly Chamber of the State-house at Trenton, N. J., beginning Monday, December 6th, and continuing through the 7th and 8th.

Applicants for examination must file photograph and preliminary credentials with the application or it will not be received. Sessions begin promptly at 8 A.M. each day. Monday, December 6th, will be devoted to practical examination, Tuesday and Wednesday to theoretical examination.

Applications must be filed ten days prior to the meeting.

CHAS. A. MEEKER, *Sec'y*,
29 Fulton st., Newark, N. J.

TEXAS BOARD OF EXAMINERS.

THE regular meeting of the Texas State Board of Dental Examiners will be held in Dallas, Texas, beginning 9 A.M. Monday, December 13, 1909. Diplomas not recognized or registered. Examination required of all. No interchange of license with any other state. No special examination to practitioners already in active practice. Applications,

accompanied by a fee of twenty-five dollars, should be in the secretary's hands by December 10th. For further information address

BUSH JONES, *Sec'y*, Dallas, Texas.

INDIANA BOARD OF EXAM- INERS.

THE next meeting of the Indiana State Board of Dental Examiners will be held in the State-house, Indianapolis, January 10 to 14, 1910. All applicants for registration in Indiana will be examined at this time. For further information address

F. R. HENSHAW, *Sec'y*,
507 Pythian Bldg., Indianapolis.

ARMY DENTAL CORPS.

MEMORANDUM of changes of stations of dental surgeons, U. S. army, for the month ending October 9, 1909:

Minot E. Scott: Ordered to proceed from South Berkeley, Cal., to Vancouver Barracks, Washington, for duty.

Geo. I. Gunckel: Left Fort Oglethorpe, Ga., for duty at Fort McPherson, Ga.

Frank L. K. LaFlamme: Will proceed to Fort Wayne, Mich., Fort Brady, Mich., and Fort Benjamin Harrison, Ind.

UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING SEPTEMBER 1909

September 7.

No. 933,718, to TIMOTHY MAHONEY. Dental tool.

September 21.

No. 934,536, to FERNANDO JAUQUES. Method of forming tooth-crown matrices.

No. 934,958, to CALVIN S. CASE. Tooth-regulating device.

September 28.

No. 935,295, to HENRY D. BULTMAN. Vulcanizer.

No. 935,419, to W. L. SMITH. Rack for dental and like tools.

No. 935,420, to W. L. SMITH. Rack or tray for dental and like instruments.

No. 935,493, to G. G. GRAMM and A. F. TIMME. Tooth-brush.



A. K. Johnston

THE DENTAL COSMOS.

VOL. LI.

DECEMBER 1909.

No. 12.

ORIGINAL COMMUNICATIONS.

THE ANATOMICAL AND PHYSIOLOGICAL CONSIDERATION OF THE ORGAN OF MASTICATION.

By H. C. FERRIS, D.D.S., Brooklyn, N. Y.

(Read before the Susquehanna Dental Association of Pennsylvania, at its forty-sixth annual meeting, Harvey's Lake, Pa., May 18, 1909.)

THIS treatise was written to emphasize the value of the study of the oral cavity, the organ of mastication, in its relation to the physical system, with an aim toward a broader view of the field of dental surgery and its true position as a specialty in the healing art. The anatomy and physiology of this part is studied in college, but is too often forgotten by the specialist in his effort to restore for remuneration lost tooth structure by mechanical means, and the consideration of his greater duty to mankind is neglected in his treatment of symptoms.

The cause of the deterioration of the value of this powerful organ is referred too frequently to the specialist, the oral surgeon, orthodontist, or prophylactic operator, to reflect credit upon the general dental practitioner. Is he neglecting his duty, or is he in a semi-comatose state? Is he satisfied to be called a tooth car-

penter, or does he ever expect to elevate himself to his true position? If anything in this treatise will awaken the dentist's interest to the responsibilities of his field, the essayist will feel himself well repaid.

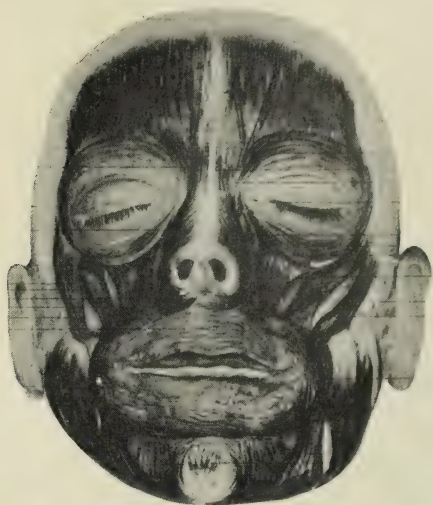
The osseous parts of the masticatory organ are most powerful, and are composed of five bones—the superior maxillæ, the mandible, and the palate bones. The first articulate with thirteen bones of the cranium, the mandible with two, and the last with six. These support thirty-two teeth in the adult and when in normal occlusion permit of the typical growth of the bones, provided the organ functionates normally. Is it not our duty to see that the full set of teeth is retained until maturity, and that the one hundred and thirty-four inclined planes of these teeth are in normal position?

The mechanical arrangement of these

digits in the alveolus and the forms of the bones operated by the muscles which are attached to them constitute a voluntary organ which is the most powerful organ of the digestive apparatus, having a crushing strength of 200 pounds or more. (Fig. 1.)

Are we superior to our Creator who conceived this organism, that we may modify it by extracting a third molar or

FIG. 1.



Illustrating the superficial muscles of the face and jaws.

by building an abnormal cusp with our filling material, and thereby assume that these parts are of little value?

The muscles are most beautifully arranged to perform their functions, if they are not perverted in their angle of contraction upon their attachments; but their forces can operate for evil if not guarded by a knowledge of the normal position, resulting in a counter action against nature's developing forces.

Have we studied these forces? Have we a set of models of the growing denture at varying ages up to maturity to prove that we know what takes place in normal growth of the bones of this region in a given subject? Does this not clearly come within the field of the general practitioner, who has the child under his care from three years of age?

The muscles of the face not only assist mastication, but when stretched over normal osseous parts portray the mental condition of the individual. Every emotion is here discernible. The moral and intellectual expressions of our subject come within our responsibility.

Allow these osseous parts to develop abnormally, and you will observe the results. Restore them and the records speak for themselves. (See Figs. 2-9.)

Inside this osseous and muscular framework we find that nature has provided a nerve, arterial, and lymphatic supply that is commensurate with the importance of the organ. We find special nerve-endings on the tongue responding to chemical action, giving the sense of taste. These nerves are both motor and sensory, connecting intimately with all the senses.

The misconception of their value may result in the loss of life, or destroy the value of the gastric secretion, or influence circulation through cardiac depression—which results frequently—or, through reflex action, be a cause of unnecessary mastoid operations, not to speak of cross-eyes, cranial neuralgia, etc.

The blood supply to the teeth has been recently studied and presented to us by J. Bethune Stein, professor of physiology of the New York College of Dentistry, his investigations showing the extreme vascularity of these parts.

He has also not only proved to us that the blood supply does enter the superior part of the capsule in which the growing tooth lies, but has shown in the jaw of an ox and a calf the direct connection between the inferior dental artery and the peridental membrane—contradicting the statements made by some of our recent writers.

This illustrates to us that it is inadvisable to accept as scientific the results of one or two investigations, and proves that the diagrammatic illustrations of circulation to these parts may not be as wrong as some of our scientific investigators in this field have been inclined to believe. These findings should also be encouraging to any young man as offering a field of investigation in which he

might gain a reputation and be of great service to his profession.

strated, and it may be noted how they are anchored in the alveolus and cementum.

FIG. 2.



FIG. 3.



FIG. 4.



FIG. 5.



The arrangement of the fibers of the peridental membrane can be demon-

The lymphatics are most complete; their breaking down, owing to absorption

of toxins from putrescent pulps and to septic pockets in the alveolus, re- contains secreting glands which produce fluids that are not merely filtered blood,

FIG. 6.



FIG. 7.



FIG. 8.



FIG. 9.



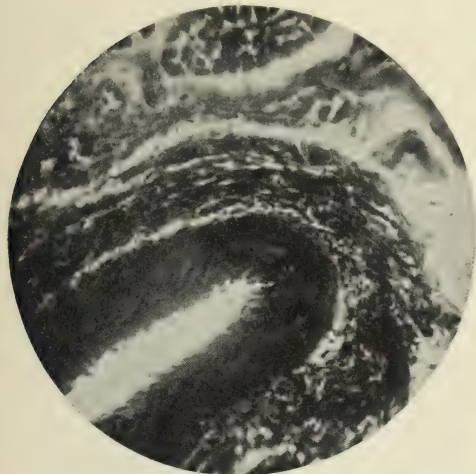
sults in constitutional infections. Moreover, we find that this masticatory organ

as was once supposed, but contain cells that secrete their own product and refuse

to permit certain drugs introduced into the circulation to pass through them—producing certain chemicals and ferments peculiar to themselves for the express purpose of digesting foods before they enter the stomach.

Fig. 10 shows a microscopic section of one of the glands, the submaxillary,

FIG. 10.



of a three-year old subject. You will see how intricately it is constructed. The mucous glands, which are numerous, also assist in supplying constituents to the mixed secretion that we call saliva.

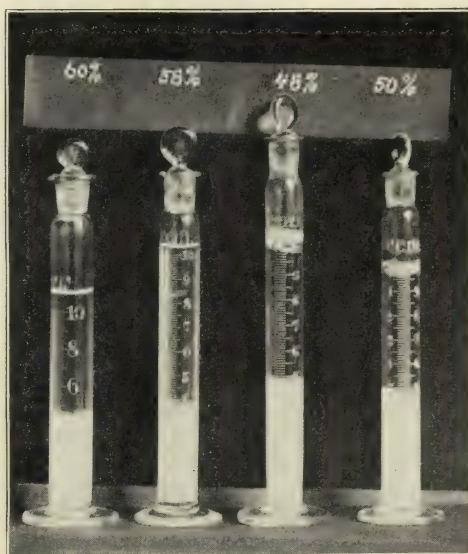
What do we know about the saliva? We are aware of the fact that it moistens our food and helps to form a bolus. We know that the combined secretions of these glands in twenty-four hours amount to 1500 ccm. or 48 ounces. The urinary secretion averages from 1000 to 1500 ccm. in twenty-four hours in the United States, and varies according to the body weight. (Simon.) The gastric secretions also vary, corresponding to one-tenth of the body weight, or approximately 1500 ccm. in twenty-four hours. (Ridder and Schmidt.) You will see by these comparisons that the saliva in volume compares well with the other secretions and excretions of the body.

But what of its physiological chemistry? Has it been studied? You can

cover all the literature on this subject in two weeks. Saliva contains one animal ferment recognized by the physiological chemists and called ptyalin, which has the power of converting starch into sugar or maltose. After years of study upon gastric and pancreatic juice, blood, and urine, the pathologist is just awakening to the fact that the saliva contains an oxydase and possibly two or three ferments.

Is it not time that we, professional guardians of this organ, and scientifically educated men, study our own field? We do not have to use a test breakfast or stomach pump to secure the secretion for experiment, nor a capsule composed of yellow elastic tissue to time chemical action. It is human nature to want to

FIG. 11.



study those things that are hardest to reach and overlook those that are easy of access!

We can use our own saliva, and with a corked graduated tube determine, by masticating 10 ccm. of a 2 per cent. solution of boiled starch fifteen times, the sugar-reducing power of our saliva, noting the primary and secondary enzymotic action upon this product.

It is of interest to observe that this power varies according to the systemic condition of the patient. Specimens examined of subjects afflicted with epilepsy, tonsillitis, or any elevation of temperature, show little or no action at the end of an hour.

Secondary reaction, however, will progress. A specific case of tonsillitis examined showed no action in an hour, and

There is no doubt that the saliva plays a larger part in the digestion of food than is recognized, and our latest physiological chemists call attention to this fact.

Do the chemicals and the bacteria of the saliva affect other food than starch? This is not known; that pathological conditions of the stomach result from imperfect mastication and insalivation of food,

FIG. 12.

FIG. 13.



a digestion of 50 per cent. in three days; a case of epilepsy showed an action of 5 per cent. in one hour, and 48 per cent. in three days; two cases of malocclusion with an abnormal chemical balance in the saliva, with ammonia in excess of sulfocyanates, showed an action of 10 per cent. in one hour, and 58 and 60 per cent. at the end of three days.

The percentage of sugar or maltose thus formed may be determined by the hydrometer test, using the Brix scale as a standard. You will note the results of this action upon the tubes shown. (Fig. 11.)

Does the pathologist consider this? No, but he will in the near future!

there is no doubt. Dr. Jacob Fuhs of Brooklyn states that hyperemia, excessive secretion of mucus, and hypersecretion of gastric juice result. If this condition is prolonged, congestion of the mucosa results, with interference in the functions of the pylorus and of the cardia. This condition leads to retention and fermentation of the gastric contents.

Excessively acid and irritating stomach contents are responsible for the frequent occurrence of cardio-pyloric spasms, one of the most painful affections. At times the spasmodic contraction is confined to the pylorus, while the cardia remains open or opens readily. Then the food and gases regurgitate, until the pyloric spasm is relieved.

Disturbances of similar nature occur in the small intestines when food improperly prepared reaches these organs. Spasms and disturbances in secretion and mobility result, with impairment of absorption. Dr. Fuhs further states that the great importance of thorough mastication has been shown in many patients who have suffered from achylia gastrica, and in others with greatly diminished gastric secretions.

In these cases the subnutrition, the diarrhea, the flatulence, the decided emaciation, all disappear with a very finely broken-up diet and with careful mastication. In some instances the gastric secretion reappeared.

Though in others this secretion was permanently lost, the patients remained in good health through care in the administration of food and its fine division.

It is of the greatest importance to use the utmost care in mastication in disease conditions of the digestive tract associated with hypersecretion and hyper-

esthesia. It is easily demonstrable that coarse food increases pathological secretions, accentuates hyperchlorhydria, and augments the hemorrhagic transudates and the secretion of thick mucus.

You will see from the following report of an orthodontic case (see also Figs. 12 and 13), the results of making chemical analyses of the saliva and urine—shown in detail in the accompanying tables, from charts plotted for comparative changes.

The patient was twelve years of age, suffering from Pott's disease, ankylosis of the dorsal vertebræ. She weighed 42 pounds and wore a plaster jacket weighing 7 pounds. She took but little solid food, could eat but fifteen minutes, and would then have to lie down for fifteen minutes to digest it, in such stages gaining what little nourishment she could take.

At the end of the time occupied in the correction of the malocclusion she had gained 25 pounds and could dispense with the plaster jacket. She is now rosy-cheeked, and is ready for all meals, having meat once in three days. She stands at the head of her class in school and is growing normally.

CONDENSED SALIVARY ANALYSIS, TAKEN TWICE A WEEK FROM NOVEMBER 20, 1907, TO OCTOBER 3, 1908.

	Nov. 20, '07.	Feb. 22, '08.	May 3.	July 23.	Oct. 3.
<i>Time of delivery</i>	40 min.	30 min.	10 min.	40 min.	15 min.
<i>Consistence</i> . . .	sticky	thick	thick	thick	thick
<i>Odor</i>	sickly sweet	garlic	garlic	minus	minus
<i>Specific gravity</i> .	1.004	0.999	0.999	1.000	1.000
<i>Precipitate</i> . . .	large	minus	minus	small	small
<i>Acid index</i> . . .	6.0	5.0	3.0	1.5	2.0
					(CO ₂ was not eliminated)
<i>Chlorin</i>	minus	present	present	present	present
<i>Sulfoeyanate</i> . . .	1 : 12,000	1 : 11,000	1 : 11,000	1 : 11,000	1 : 9000
<i>Ammonia or organic matter</i> .	1 : 14,000	1 : 13,000	1 : 11,000	1 : 13,000	1 : 13,000
<i>Acetone</i>	present	minus	minus	minus	minus
<i>Mucin</i>	minus	excess	excess	normal	normal
<i>Albumin</i>	excess	"	trace	trace	trace

Eliminated all liquid diet and meats for a week, then meat allowed every third day.

R—Potassium sulfoeyanate, gr. 1/75
Sugar of milk, q.s.

Sig.—One pill night and morning.

R—Carbonate magnesias,
Bicarbonate soda, āā gr. iij. M.

Sig.—Three times daily after meals.

Half grain calomel for two days, stopping two days.

(Had gained 18 lb. in weight, and one inch in chest expansion, by October 3d.)

CONDENSED URINARY ANALYSIS FROM FEBRUARY 22 TO OCTOBER 3, 1908.

	<i>Feb. 22.</i>	<i>May 3.</i>	<i>July 23.</i>	<i>Oct. 3.</i>
<i>Acid index</i>	30	85	45	90
<i>Specific gravity</i>	1.032	1.024	1.020	1.008
<i>Indican</i>	excess	trace	normal	normal
<i>Sugar</i>	15 per cent.	10 per cent.	"	"
<i>Albumin</i>	excess	trace	"	excess

Note in the tables the changes in the chemical elements in the saliva and the elimination of the pathological properties, both in the saliva and in the excretion.

Our work is proved here, as the physical changes cannot be attributed to other causes alone. Such records close the mouths of the unbelievers.

The Committee on Scientific Research of the National Dental Association have formulated a technique sheet with full directions, and have compiled a set of instruments and reagents that are supplied by Eimer & Amend of New York city, at an expense of \$20.00, which will enable anyone who is interested in this work to follow their findings and suggest improvements for the next year's report.

This salivary colorimetric scale (Fig. 14), for attaining the quantitative analysis for sulfocyanates, is composed of two tubes of equal caliber. Tube A is graduated for 1 cm. Tube B is graduated for 10 cm. with ten divisions, each one divided into five subdivisions. They are backed with white glass with a blue focusing line running through the middle. In order to make a reading we place 1 cm. of specimen in tube A; 1 cm. of sulfocyanate of ammonia 1:2000 in tube B; add two drops of 5 per cent. ferric chlorid solution to each tube from the same pipette. The color struck in tube B will be darker than that in tube A; by reducing the standard solution in tube B with aqua destillata until you match the color in tube A, you are enabled to read off the amount of sulfocyanates in the specimen in one-thousandths.

The content of ammonia or inorganic matter is attained in the same manner by substituting ammonium chlorid 1:2000 as your standard and Nessler's reagent in place of ferric chlorid.

This special salivary hydrometer (Fig. 15) is devised for obtaining the specific gravity of 3½ cc., the specimen being introduced in the lower receptacle, and the instrument floated in water. It is possible with this instrument to read negative quantities, which not infrequently occur in salivary analysis.

The committee is soliciting the assistance of as many as will work in establishing the normal constituents in 5000 patients. Then the pathological problems which we have before us may be solved. But until we understand the normal properties of this secretion, we cannot intelligently report on the abnormal.

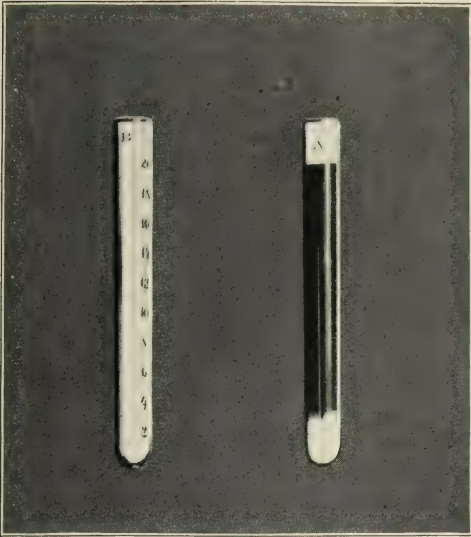
By such careful study of the organ of mastication we may be able one day to rightfully ask more consideration for our specialty from the general practitioners of medicine. But we must prove to them and the public that we are in possession of information in our field that will warrant their confidence.

This short treatise touches only the main points of this subject: The normal development of the osseous parts and the forces that bring about normal development, the effects of the muscles in their normal position, and the result of mutilation and of the growing structure upon the artistic balance of the features, with consequent muscle change producing abnormal expression. It also treats of the histology of the growing denture, of the

peridental membrane, of the blood, nerve, and lymph supply to the teeth, together with the formation of the salivary glands, of the saliva as a mixed secretion, and

A better appreciation of our duty to science and to mankind seems imminent. The enormous amount of good we can do should awaken us to better efforts

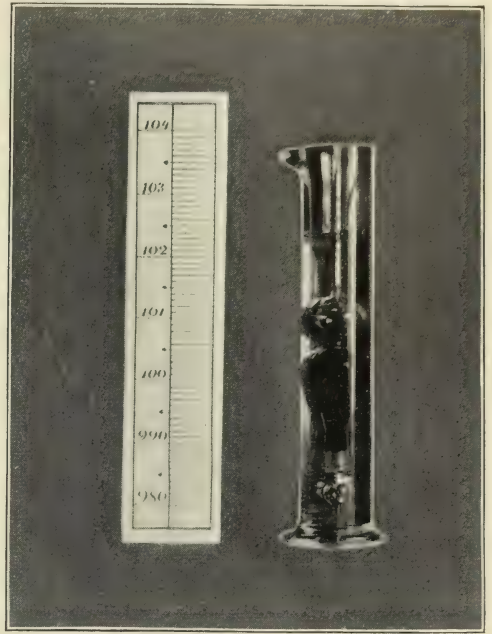
FIG. 14.



Colorimetric scale.

of a method of technique for determining its ptyalin and bacteriological action upon starch. It also illustrates by means of a tabulation of salivary and urinary analysis the physiological changes taking place in these secretions during the correction of a malocclusion in a case of Pott's disease, with the introduction of a colorimetric scale and a salivary hydrometer as utilized in this work.

FIG. 15



Salivary hydrometer.

from an altruistic standpoint. Financial reward follows every unselfish impulse. Let us study the histology, anatomy, and physiological chemistry of the organ of mastication, and we shall be better dentists.

THE PATHOLOGY OF THE PULP IN RELATION TO CLINICAL DENTAL SURGERY.

By A. HOPEWELL-SMITH, L.R.C.P.Lond., M.R.C.S.Eng., L.D.S.Eng., London.

IT is impossible within the brief compass of one article to treat at all exhaustively or satisfactorily of the pathology of the pulp. The writer is, however, anxious to place on record some of his latest observations dealing with this matter, as a supplementary note to his work published elsewhere.

INTRODUCTORY.

The subject is vast, important, congenial, fascinating, but unfortunately at present only partially developed. The reason why it is only partially developed lies chiefly in the fact that the microscopical technique associated with its study is so tedious to accomplish, and sometimes so uncertain in its results, that it does not appeal to the worker in dental histology in spite of there being ample clinical material and ample scope for research. No thoughtful reader can for an instant deny the immense importance to the dental surgeon which attaches to the subject, especially to one who has lofty ethical ideals and who practices his art in its most conservative forms. All the systematic knowledge of diseases of other organs of the body which we possess—except, perhaps, those relating to myology and osteology—the morbid conditions of the bloodvessels, of the nervous mechanism, of the cellular system, wholly or in part, simple or complicated as they sometimes are, focus themselves on that minute structure in a tooth which we call the pulp, which is physiologically and in very truth the marrow of the tooth.

THE DENTAL PULP ANALOGOUS TO BONE MARROW—A PERFECT ORGAN.

There is not so much known about pathological conditions of the marrow

of bones generally, but we probably do understand in a measure some changes which the marrow of a tooth has undergone when subjected to local or constitutional disturbances. And this is not at all surprising when one begins to realize that it is a perfect organ in a way, with its small arteries, veins, capillaries, and medullated and non-medullated nerve fibers and cells whose functions are partly odontoblastic in nature, and partly are closely associated with the sensory nervous apparatus—a perfect organ situated on the terminal fringe of that complicated tangle of sentient fibers, the largest cranial nerve, the trigeminus. It is on this fact and on all that it implies that the importance of the pulp depends, and that makes its conservation above any other dental tissue of the supremest moment. It would be futile on the part of the writer to marshal in review the pathological conditions of which the pulp may be a victim. These can be found in the pages of text-books. It is assumed that an article of this kind should represent something higher than a mere *réchauffé* of facts or theories; it should exhibit traces, at least, of original observation, experience, and work. This, therefore, is intended as a record of some years of research, although it does not advance any novel or startling hypothesis, but is designed to be suggestive rather than assertive, argumentative rather than dictatorial. In other words, *donner à penser à quelqu'un*, to indicate possibilities, and to chronicle one or two sidelights which seem to have some bearing on the pathology of the pulp.

The subject may have been approached in two ways. On the one hand, it may have been considered strictly from the point of view of the association of certain signs, and subjective and objective symp-

toms and treatment, with the morbid conditions of the pulp; or on the other hand, the diseases and degenerations of this organ might have been systematically and histologically described, and linked in thought with certain clinical aspects of dental surgery.

(I.) CARIOUS LESIONS.

DIFFICULTIES IN ELUCIDATING CERTAIN PROBLEMS.

The writer wishes it had been possible for him to have stated clearly and satisfactorily what happens to the pulp and surrounding parts when obtundent drugs have been placed in a cavity of decay; what takes place when antiseptic solutions are used, what physical, chemical, physiological, or pathological changes are induced when the various filling materials have been, for a given length of time, brought into contact with enamel and dentin.

A perusal of the papers of Miller and Truman which appeared in the *DENTAL COSMOS* for 1890 and 1895 respectively, and a search through subsequent literature, serves to show the incompleteness of our knowledge of perhaps the most important and most common condition of things, viz, the exact results which occur in our daily mechanical and chemical treatment of diseases of the vitalized dental tissues and of the effects of dead bodies on living substances. The meeting-point of the dead and living is indeed a mystery. It is, of course, admitted that many facts are known about these things. James Truman⁽¹⁾ published in this journal for January 1895 a most interesting account of his work "On the Relative Penetrating Power of Coagulants." In spite of his writings being punctuated here and there by such words as "possibly," "perhaps," "probably," he would seem to have definitely proved that zinc chlorid should not be used as an obtundent of sensitive dentin, because "it is exceedingly dangerous to the life of the pulp," though he does not precisely describe what causes this danger, and entirely ignores the patho-histo-

logical side of the question. He further writes (page 39): "In every instance, silver nitrate has proved deeply penetrating and coagulating with rapidity and certainty very nearly equal to zinc chlorid"; but still he adds, "The result has not been entirely satisfactory."

The nearest approach, however, to a scientific attempt to unravel these knotty points was that achieved twenty years ago, by Miller⁽²⁾, who, nevertheless, limited his observations to the comparative value of antiseptics used in dental surgery, making use of pulps which, being isolated from the mouth, had lost their natural living surroundings. These, therefore, at present, are unsolved problems, the explanations given as to the actual phenomena which occur being most vague.

DIVERGENT OPINIONS ON CERTAIN PROBLEMS.

For instance, Black⁽³⁾ in his "Operative Dentistry," just published, vol. i, p. 193, in treating of the question of curative effects of fillings says: "Fillings cure purely and simply by shutting out everything from contact with dentin. . . . No systemic change is produced as a direct effect."

Again, Inglis⁽⁴⁾, in the third edition of Burchard's excellent "Dental Pathology and Therapeutics," writes: "A process of eburnation is set up when the progress of caries is delayed, and in some cases ceases." Yes! but what is the "process of eburnation"? The author tells us (p. 277): "The continued stimulation of the ends of the dentinal fibrillæ which are exposed in abrasion causes them either to become hypersensitive or stimulates them to formative activity. Tubule material is built upon the inner walls of the tubules, obliterating their lumen. This is the so-called tubular consolidation or calcification (eburnation)."

This statement is in entire disagreement with that of Black, *op. cit.* p. 128, who says: "The suggestion has been made that some additions of calcium salts may be made on the walls of the dentinal tubules, narrowing their caliber. This

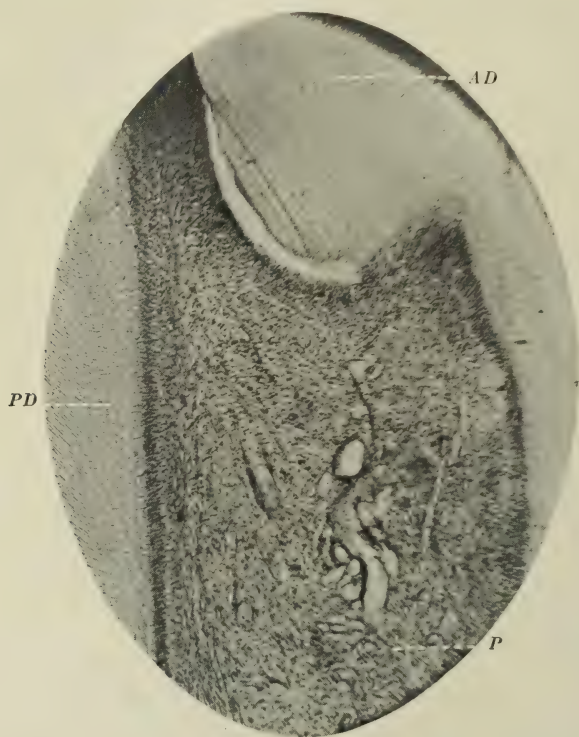
is plausible, but as yet no sufficient series of measurements have been made to determine the facts." And again: "Dentin or enamel once formed is formed for all time, it can never be re-formed, changed, or improved in its character or qualities."

By certain clinical aspects of dental surgery, of which mention was made just

THE QUESTION OF CAPPING EXPOSURES.

We cannot treat a superficial or deep ulceration or incised or punctured wound; we cannot get rid of an infected condition, or restore a functionless pulp to its normal activity, without the complete destruction of the organ. The ana-

FIG. 1.



Longitudinal section of canine with pulp *in situ*. Enamel was hypoplastic, and subsequently, with the dentin, became chronically carious. There are no micro-organisms in the adventitious pulp. *PD*, Primary dentin. *P*, Pulp. *AD*, Adventitious dentin.

now, is meant the palliative and operative treatment of diseases of the pulp. This tissue with an infinite variety of disease—inflammation and its terminations, degenerations, senile changes, and more remarkable reconstructive potentialities, offers but few opportunities to the dental surgeon for the display of his surgical knowledge and principles and his skill. They may be summarized as two only, the problem being "to cap or not to cap," to devitalize or not to devitalize.

tomical peculiarities of the hard and soft parts are antagonistic to these things. If we do happen to be successful in capping an exposure of the pulp, under the very strictest aseptic precautions, it is probably because we are fortunate in having to deal with only non-liquefying micro-organisms in the dentin and in the immediate neighborhood of the tooth which we are treating.

In this connection it may be recalled that Goadby⁽⁵⁾ has discovered only the

Streptococcus brevis and the *Bacillus necrodentalis*, which are liquefying organisms, in the deep layers of carious dentin.

In 1900, in Paris, the writer⁽⁶⁾ ventured to emphasize the fact that capping was as a routine method of practice always a failure. It seems to him after a riper experience that generally the operation is not a success on account of the prevalence and presence of these facultative (obligatory) aerobes, which, accord-

part of the pulp itself, but also on the part of the adventitious dentin which has been deposited on its surface. The author has failed in his attempts to stain bacteria in the pulp and adventitious dentin in some carious teeth which presented a hypoplastic condition of the enamel. (See Fig. 1.) This leads one to suppose that if this adventitious dentin is produced early by an energetic pulp, and if the caries proceeds at a slow

FIG. 2.



Areolar adventitious dentin—a most suitable nidus for the growth and development of the micro-organisms of caries. Rapidly formed as a protection to the pulp. PD, Primary dentin.

ing to Goadby, are capable of obtaining oxygen from gelatin, which is the end-product of collagen.

THE PHYSIOLOGICAL RESISTANCE OF THE PULP.

But this is not all. There is another factor which is probably of greater importance than the presence of these micro-organisms; this is the physiological resistance of the pulp. It would seem that when the operation of capping is unattended by pain or by death of the pulp—no matter how long delayed after the actual treatment—it is due to the physiological resistance not only on the

uniform rate, the pulp will not become infected and the case would be suitable for capping an exposure, if one should by any chance be made, either idiopathically or traumatically or pathologically. (Fig. 2.)

Miller considered that there is in the free thin margin of enamel a certain amount of physiological resistance, as also in the translucent zone of carious dentin. (Fig. 3.)

It is probable, nay certain, that a large amount of physiological resistance resides in the pulp also, as witness the unvarying frequency with which it lays down adventitious dentin. And if a perfect capping has been performed and faculta-

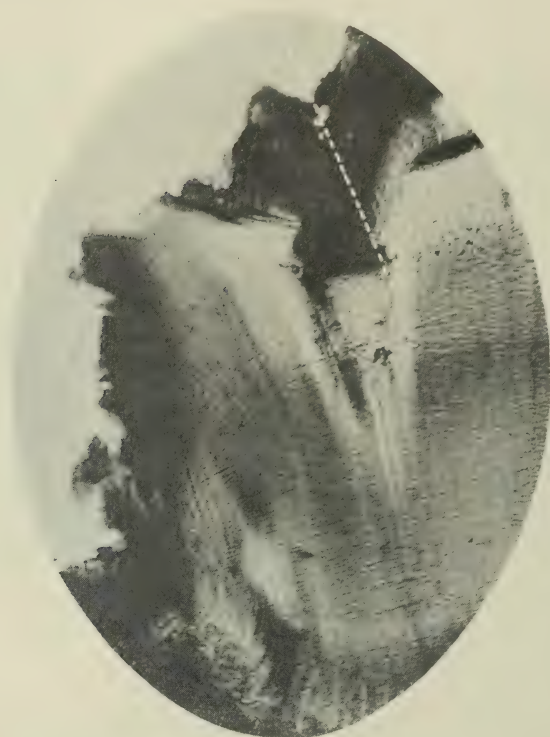
tive micro-organisms are absent or few in number, and the pulp always retains its high degree of physiological resistance, the results will be entirely satisfactory.

Conversely, therefore, anything which destroys or reduces or abolishes this physiological reaction, such as prolonged men-

tacked—that is, that which is nearest to the breach of surface—is either coronal, coronal, cervical, or radicular. Sections of teeth extracted during a paroxysm of odontalgia reveal this quite clearly, but chronic caries does not necessarily produce it. Coronal regional hyperemia may exist to a slight degree in such caries, but

FIG. 3.

TZ



Caries of dentin. TZ, Translucent zone.

tal anxiety, chronic wasting diseases, often repeated traumatism of the hard parts, frequent and varied thermal stimulations, will in the end, in spite of the aseptic care of the operator, tend to bring about disaster, and the pulp will die.

REGIONAL HYPEREMIA.

Dental caries, when acute, is accompanied in its early stages, as our daily experience testifies, by a regional hyperemia which according to the part at-

when the physiological resistance of the pulp is fully restored and permanently established, not only does this hyperemia undergo resolution, but the contents of the dentinal tubes claim their share in the physiological resistance, and arrested caries results, often the whole phenomena of decay and arrest proceeding without any pain.

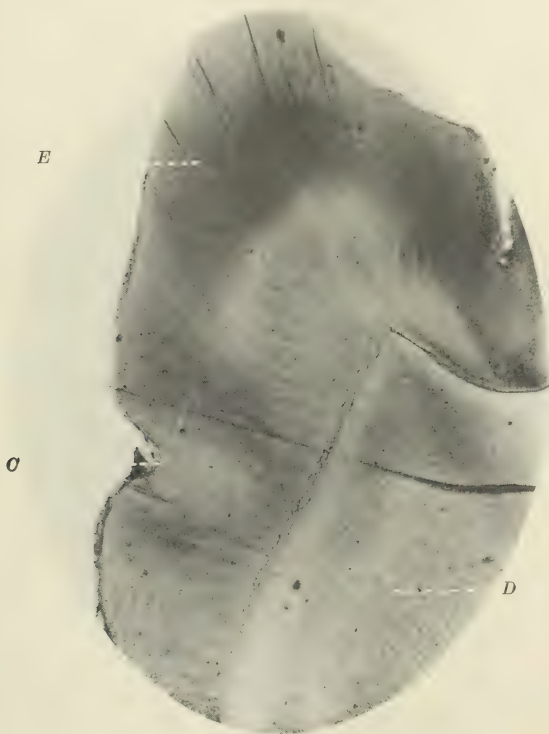
ARRESTED CARIES.

One would have thought that arrested caries would have been associated with

deposits of secondary and adventitious dentin on the pulp surface. This is not necessarily so. Specimens of true arrested caries are not easy to obtain, but those that have been prepared specially for this paper show no sign of this, nor pathological conditions of the pulp. If

of the Grenacher's borax carmine which one uses in conjunction with this process. (Fig. 4.) The transverse striæ are more marked than natural, and the tissue has the appearance of having been washed in a weak acid solution. This staining of the enamel may not occur universally;

FIG. 4.



Longitudinal section through a cusp of a molar showing signs of "arrested" caries. Surface of enamel and dentin (where exposed) blackish in color. *E*, Enamel. *D*, Dentin. *C*, Caries making breach of surface of enamel prior or subsequent to the general arrest of the process. "White spot" absent; enamel tissue fully stained.

specimens have been prepared by the Koch-Weil method, even before immersion in the graduated alcoholic solution, the dentin is extremely hard and resistant to a fret-saw, such as an American No. 4. What enamel remains on the surface is also exceedingly dense and difficult to cut. Curiously enough, however, and for what reason it is at present impossible to determine, the enamel rods become stained throughout their length by means

the calcification of the teeth varies considerably even in the same mouth. Still it is evident that but little clinical significance can lie in this fact, although it is interesting from the histological point of view.

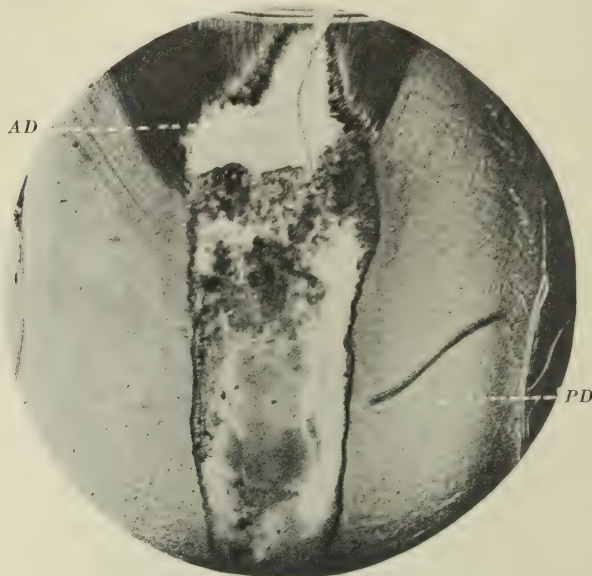
SOME SENILE CHANGES.

As age advances the pulp cavity is not encroached upon to any appreciable extent by new deposits of dentin as a nor-

mal event. My observations do not accord with Tomes⁽⁷⁾, who remarks in the last edition of "A System of Dental Surgery," page 416, "The area of the pulp cavity becomes gradually diminished by the slow addition of dentin to that which was formed when the tooth was in a state of active growth"; nor with those of Dr. Loos⁽⁸⁾, who, in *Scheff's Handbuch der Zahnheilkunde*,

of the pulp cavity. The root-canals in advanced age are mostly found narrowed; but frequently from the wall of the pulp chamber only certain places are distinctly altered, viz, those which border on the pulp chamber in a vertical direction. As the size and form of the pulp cavity are subject to manifold individual variations, it is often very difficult to find out whether we have to do with nor-

FIG. 5.



Longitudinal section (mesio-distal diameter) of lower incisor of patient aged seventy-one. Pulp chamber filled with debris and detritus by grinding. Small amount of adventitious dentin—marked attrition. *PD*, Primary dentin. *AD*, Adventitious dentin.

states that "There must be mentioned a general, physiological, senile new formation of dentin," and continues: "With the entire development of the teeth normal dentin formation does not stop, but continues slowly up to the greatest period of age. A proof of this is the fact that the pulp cavity in advanced age is found to be smaller than in earlier years—indeed, it may entirely disappear and this physiological new formation of dentin produces most diffuse uniform thickenings of the dentin wall. It appears, however, that this dentin formation does not take place uniformly over the whole wall

mal or with altered conditions. Histologically this dentin does not exhibit any noteworthy differences from the normal, and it can scarcely be distinguished from substituted dentin or odontheles (pulp nodules)."

If this is a normal physiological process on the part of the pulp, one would expect to find it universally in all senile teeth; but it is not so. Here, for instance, is a case in point, where the diameter of the pulp chamber measures 3 mm. (Fig. 5.) The history of the tooth was as follows: "Male, aged seventy-one. No inflammation of pulp, slight amount

of tartar, tooth loose, not isolated in position, alveolar process absorbed and walls of sockets thinned, pyorrhea present very markedly."

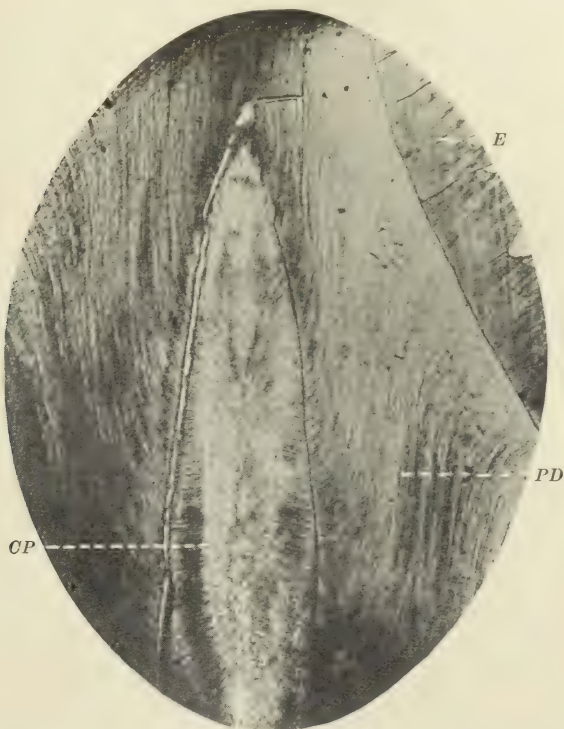
It is quite impossible to understand how calcification of the dentinal tubules can occur and how the pulp chamber can become lessened in size, except by the

caliber of the dentinal tubules at their centripetal and centrifugal extremities.

SYSTEMATIC DENTAL HISTORIES.

At this juncture the writer must ask to be allowed for a moment to digress slightly from his subject, in order to

FIG. 6.



Longitudinal section of a senile tooth. *E*, Enamel. *PD*, Primary dentin. *CP*, Calcified pulp.

production of new adventitious dentin. Of course odontoblasts are still present up to the end of the life of the pulp, but they are not functional after the fiftieth or sixtieth year. When the process of dentinification has ceased, and fresh secondary dentin is deposited, the microscope usually exhibits very clearly the line of demarkation between young and old tissue. (See Fig. 6.) The idea which has been current for generations probably arose in the attempt to account for the discrepancies in the size of the

draw attention to the need for and the methods of systematically obtaining reports of teeth which should be of scientific value when research work is being done. He refers to the individual "histories" of teeth. It is important that the investigator should learn thoroughly all he can about the objects he studies, and so it seems imperative that with regard to teeth which we are about to examine we should ascertain the following points: (1) Age of the patient. (2) Sex. (3) Denomination of the tooth. (4) Ob-

vious disease of the pulp or periodontal membrane. (5) Presence of pyorrhea alveolaris. (6) Position of the tooth or teeth in regard to the dental arch. (7) Conditions of the socket at the time of extraction. (8) Presence or absence of tartar. (9) Presence or absence of any obvious lesions of the hard parts, such as attrition, abrasion, or erosion.

The *age* of the patient is useful as a general guide as to what to expect. One need not dwell on the importance of this in the young. Apart from the question of age in treating the irregularities in position of the teeth, it is equally essential to ascertain the age of the patient in order to gage somewhat the conditions of the pulp or root membrane. Thus we know that the apical foramen in the permanent canine is closed shortly after the tooth has erupted. We know that the pulps of elderly people become less sensitive as years pass by. We know that there are three cornua to the pulp of the permanent central incisor up to the fifteenth year, when they disappear; and so on. But age does not always prove a reliable guide, for, as will be presently shown, very frequently the pulps of children's deciduous and permanent teeth may exhibit senile and other degenerative changes.

Sex. One cannot recognize with facility the difference, either macroscopically or microscopically, between the teeth of a male and a female patient. Of course this degree of variation is nothing like so great as between the hair, or brain, etc., of the two sexes. The curvatures of the enamel rods are apparently the same; the structure of the two pulps is apparently identical. But the writer believes that there is a dissimilarity between them in the size, the structure, and the chemical and functional characteristics of the teeth.

Regarding the first, Amoëdo⁽⁹⁾ records in a tabulated form some measurements made by Mela between the size in transverse diameter of the central and lateral incisors of man and woman. The figures show that the mean difference between the dimensions in a mesio-distal direction of the central maxillary inci-

sors of the two sexes is 0.627 mm.; of the maxillary lateral incisors 0.159 mm. The mean measurements between the maximum diameters of the central and lateral incisors was 2.25 mm. in man, and 1.89 mm. in woman, a difference of 0.38 mm. The maximum diameter of man's central incisors gave a maximum of 11 mm. and a minimum of 7.5 mm., that of the same teeth of woman giving a maximum of 9.8 mm. and a minimum of 7.1 mm. "La différence sexuelle entre les deux extrêmes des incisives centrales supérieures," he writes, "est de 1.3 mm. à l'avantage du sexe masculin. . . . La différence sexuelle entre les deux extrêmes des incisives latérales supérieures est de 5 mm. en faveur du sexe masculin."

Regarding the last, the teeth of women would appear to be less subject to attrition or abrasion; they cannot be influenced by the same amount of muscular power as the former, though their food is more or less identical. The respective dental and muscular dynamics and potentialities of mastication are distinct, and if tested by means of a dynamometer would probably be found to differ.

Comparative anatomy teaches us that the teeth of the female vary in development, in size, and sometimes in function, from those of the male; instances need not be given. We also learn that if but a slight amount of work has to be accomplished, tooth structure is profoundly modified. Thus the edentata have no enamel, simply because their food is of so soft a character as to involve practically the abolition of the function of mastication. Again, the enamel of the manatee is arranged in rods which run straight courses; on the other hand, that of the rodents, particularly the beaver, presents a most complicated pattern. The former does not require for eating aquatic plants a dense structure such as the latter, whose teeth are used for gnawing and chiseling the barks and trunks of trees. Hence, at first sight, though it seems strange to suppose this *æ* difference between male and female teeth, there is some support for the idea. At all events, the writer thinks that there is

certainly some ground for the belief that the pulps of the teeth of women may and often do undergo unique vascular disturbances at certain periods of their lives; and this fact alone would constitute a fundamental difference between the two.

The *denomination* of the tooth is important. The enamel of incisors is less complex in pattern than that of the molars. From the chemical point of view, also, there is a remarkable difference. Gassmann⁽¹⁰⁾, in the *Zeitschrift für Physiologische Chemie*, 1908, discovered as a result of his investigations that human canines contain 29.78 per cent. of calcium salts, third molars 31.65; of water combined with the organic matters, 8.09 in the former and 6.91 in the latter. Pulps appear to be histologically identical, but most probably there is here again a dissimilarity which we are not clever enough at present to detect and acknowledge.

In other words, just as there are no two persons exactly alike, no two animals, no two birds, no two plants, no two blades of grass, so there are no two teeth precisely and in every minute particular the same.

With regard to the other points which have been outlined, which should be given in the histories of cases, one need not dwell on each in detail. One will merely add that a tooth which is isolated in position, from removal of anterior and posterior neighbors, is more likely to undergo morbid changes than one which is part of an unbroken series, owing to the undue strain or shock of mastication: that a loose tooth is a degenerate or degenerating organ, and deserves our pity; and that the presence or absence of tartar is of great importance, inasmuch as the greater the amount of tartar which incrusts the surfaces, and the longer it remains *in situ*, the less functional the tooth and therefore the more liable to become impaired the pulp.

In addition to this, the naked-eye examination of the specimen must be described, viz, the amount of tartar (if present); its position on the root or roots; its distance from the cervical mar-

gin; its nature; the translucence or otherwise of the apical region of the root; the deflections or normal appearances of the root; the amount of abrasion of the crown, etc.; in short, all the abnormal characteristics of the object under consideration as far as the macroscopical appearances are concerned.

As has been already hinted, it would be a work of supererogation for one to re-describe here the patho-histology of the pulp when it is hyperemic or inflamed, or gangrenous, or degenerating, or undergoing healing processes after injury. The writer wishes, however, to devote the remainder of his paper to considering certain conditions in which there is no apparent lesion of hard or soft parts, where they are all associated with pain.

(II.) NON-CARIOUS LESIONS.

(A) LESIONS DUE TO TACTILE, THERMAL, CHEMICAL, AND ELECTRICAL STIMULI.

(1) *Tactile impressions* which set up pain are, as is well known, those in relationship with the surfaces of the cervical margins of the teeth. No lesion may exist to the naked eye; but there is a microscopical one. These hypersensitive surfaces very frequently, indeed, develop into acutely esthetic cavities. Whence comes the pain? and what do we find on histological examination? A tiny strip of dentin uncovered by the other hard tissue. The anatomical relationships of the hard tissues at the necks of teeth are as follows: (a) Enamel overlaps the cementum in about 30 per cent. of cases. (b) Cementum overlaps the enamel in 23.5 per cent. of cases. (c) The two tissues meet *bout à bout* in 66 per cent. of cases. (d) Finally, they fail to meet at all, and leave the peripheral surface of the dentin exposed, in 27.5 per cent. of cases.

Thus the rule would be that the two tissues are in absolute contact, and both lie in the same plane without any involution whatever.

Now, enamel being outside the pale of nutrition, and once formed always

formed, and cementum itself being insensitive, it is clear that the dentinal tubules are actually exposed at their distal extremities, and their contents are irritated by the pressure or presence or friction of a foreign body in that region. Enamel is nerveless, and cementum in normal conditions does not contain any elements

raised or lowered temperature of the pulp through conduction on the part of the enamel—a state of things which the pulp immediately recognizes, by means of the dentinal fibrils. It does not always happen that a pulp is painful when icy-cold or hot water is placed on the enamel. When it is, however, it is either hyperes-

FIG. 7.



Cementum, showing its hyaline character and absence of lacunæ, the three dark masses being foreign bodies on the surface of the tissue. *D*, Dentin. *C*, Cementum. *PM*, Periodontal membrane. *AP*, Alveolar process.

of a nervous or protoplasmic character in sufficient amount to induce pain in suitable circumstances. No doubt prolonged irritation might lead to exalted sensibility on the part of the pulp, and if decalcification of the thin edges of the enamel and cementum takes place, with loss of substance, an erosion cavity is produced.

(2) *Thermal sensations* are easily explained, owing to their being due to a

thetic, or perhaps more correctly, hyperalgesic, and is more readily affected by outside influences than it should be, or the sensorium is more appreciative than natural of the impressions conveyed to it from the pulp.

Occasion arises sometimes when a devitalized tooth whose pulp has been removed gives the impression to the patient by pain that it is still present and alive. The exhaustion of air around the neck of

the tooth—that is, an alteration in or lowering of the local temperature on the part of the patient—gives rise to pain. On examination it may be found that the triangular flange of interdental gum may have been inadvertently removed while operating on the adjacent tissues, and the free edge of the periodontal mem-

ver nitrate, the writer is not prepared to say what really occurs. Cementum, he firmly believes, is incapable *per se* of transmitting sensations; and “the living chain of protoplasm” which Bödecker⁽¹¹⁾ so deftly and charmingly described as passing from the dentinal fibrils through the granular layer of Tomes to the la-

FIG. 8.



Same as Fig. 7, but differently illuminated, to show granular character of cementum.

brane nearly exposed. It is therefore probable that the root membrane transmits the sensations of pain to the brain, which interprets it as that coming from the pulp. With regard to those cases which one sometimes sees of a root or portion of a root which, having been denuded of its alveolar socket and mucous membrane, such as is frequently observed in connection with the palatal roots of maxillary molars, is very sensitive to thermal changes, and is rendered insensitive by means of the application of sil-

cunæ and canaliculi of the cementum and so on to the nervous bundles of the periosteum, is, in his opinion, a myth. For a solution of silver nitrate cannot soak through cementum whose free layers are almost homogeneous in character and hyaline in structure. (Figs. 7 and 8.)

If a pulp is frequently painful when hot substances and fluids are taken into the mouth, it indicates that, though there may be no apparent lesion, it is certainly on the “down grade.”

(3) *Chemical stimuli.* The applica-

tion of lukewarm mineral acids or alkalis to an unbroken surface of the teeth gives rise to no pain in the pulp.

(4) *Electrical impulses*, however, are full of interest. Electric cells are frequently formed in the mouth, metallic poles being present and an electrolyte intervening. The greater the electro-positive or electro-negative the metal, the greater the electro-motive force. Now, in the electrolytic scale, gold is nearly the most electro-negative of all metals placed in the mouth; while aluminum is the most electro-positive. If, therefore, two metals of different electro-motive force come into contact or almost into contact, and the saliva is ionized to such an extent as to be efficiently electrolytic, the cathions, or — ions, will move toward the + pole or more electro-positive side, while the anions, or + ions, will move toward the — pole, and a certain amount of electricity will be evolved.

This action may be carried to a greater degree than is usual in the mouth. Clinically this force becomes more manifested, at times, under certain conditions, in a disastrous manner. Thus a 16-karat gold band which is used for supporting a denture, if attached to a molar tooth, for instance, which contains a large amalgam filling, may in these cases become so electrically affected as to break, on account of the molecular changes set up by the current, and the filling similarly to become disintegrated and fall out.

Mere contact of a metal with enamel or dentin is not appreciated by the pulp. It is when two dissimilar metals are brought into contact, separated only by a thin film of saliva, which acts as the electrolyte, and the circuit is completed, that voltaic currents are set up—as for instance when the metal ring of a small mirror touches the surface of a gold or an amalgam filling. This, of course, constantly takes place during operations, and is as a rule unnoticed by the patient, on account of its extremely light character; but at times the pulp, stimulated by the electrical action, responds by a sudden spasm of acute neuralgic pain. Is the pulp normal in these latter fairly

rare cases? Probably not—it is beginning to undergo morbid changes; for the phenomenon may be observed, as far as clinical experience goes, equally beneath large as well as less bulky fillings. The pulp is not hyperemic; it is hypersensitive, or particularly “receptive,” as we might call it—owing, no doubt, to an exalted condition of the cerebro-spinal nervous system which happens to be synchronous with the electrical phenomena. Tests as to the acidity or otherwise of the saliva are unattended by success, probably because we do not possess a sufficiently delicate method of experimenting. Here, of course, mere contact with the filling alone induces no response; the circuit must be completed, either by simultaneously touching filling and tongue or filling and buccal mucous membrane.

It is interesting to note that the same degree or kind of reaction of the saliva may not obtain simultaneously in the same mouth. Thus some portions of the gums or buccal mucous membrane may show, at the same moment, an acid, an alkaline, and a neutral reaction to litmus paper.

(B) REFERRED PAIN AND OBSCURE REFLEX ACTS.

Entirely different from these local manifestations are those nerve pains set up in apparently sound teeth on holding lukewarm saccharine substances in the mouth.

A particularly sweet body, for instance, will at times, when the functions of the cranial nervous mechanism are exalted, give rise to intensely acute pain which may last an appreciable length of time and then passes slowly away. This is no mere gustatory hallucination, no co-ordinated association of ideas, but a physiological fact. Here we have a reflex act. It is impossible for sugary solutions *per se* to so rapidly attack enamel or cementum or even exposed dentin as to induce these pains. The length of time required for the paroxysm to make itself felt after the application of the stimulus is about 0.05 to 0.06 of a second. No! It is not through the hard

tissues that the impulse passes, it is through the nerve supply of the pulp. The afferent nerves are those sensory branches of the fifth which supply the oral mucous membrane and the gustatory and glosso-pharyngeal, with possibly the chorda tympani; and it is the act of placing the saccharin-bearing material on the tongue and inside of the cheek that brings about the reflex act. This, too, only occurs at times, when probably the sensorium is especially liable to receive and transmit slight impulses to teeth the pulps of which, while not degenerated, are certainly not normal.

Other kinds of obscure reflexes, not due to pathological causes, may be cited. A former house surgeon of the Royal Dental Hospital of London used to experience pain in an upper canine when he placed his forage cap—he was a volunteer—very tightly on his head and set up pressure on the supraorbital branch of the frontal division of the ophthalmic nerve. A patient tells the writer that when, in India, he has witnessed children sucking sticks of sugar-cane, he himself has had toothache.

The sensation known as “setting the teeth on edge” has been known for centuries, for the ancient children of Israel had a proverb that “The man who eateth the sour grapes setteth his teeth on edge.” So it is obvious that the optic, the auditory, and more than all, the trigeminal nerves, are closely associated with these reflex acts in health as well as in disease, and that as diseases of the teeth, caries and the like, will produce reflex disturbances in the organs and parts supplied by them, so they, conversely, under certain forms of irritability will set up toothache.

RECEPTIVITY OF THE PULP: ITS HYPER- ESTHESIA AND DYSESTHESIA.

But ordinarily no pain is felt; when it is, however, the condition of the pulp is that of dysesthesia, and comes on only when the central and peripheral nervous systems are in a state of excitability or receptivity.

The physician is often brought face

to face with other varieties of hyperesthesia, such as gastralgia, enteralgia, the epileptic aura, and so on, and the term dysesthesia is used in connection with the organs of special sense, and the condition indicated by the appearance of subjective phenomena referable to these organs—“of the eye, by the appearance of sparks and flames; of the ear, by the perception of sounds, such as humming or buzzing; of the nose, by the perception of odors; of the tongue, by the perception of flavors”⁽¹²⁾, and finally, of the teeth, by the recognition of those interesting reflexes to which allusion has been made.

(C) DISTURBANCES OF THE VASCULAR SYSTEM IN THE PULP.

Allied to these morbid states, but totally different in origin, are those rare cases a few particulars of which may be now mentioned.

Odontalgia of a severe type may be induced by morbid conditions of the blood, which circulating through the vessels of the pulp produces pain and organic change in that tissue.

Increased intradental blood pressure. To Dr. Ferdinand Tänze⁽¹³⁾ of Trieste belongs the credit of recently drawing attention to the effects of increased blood pressure in the pulp. Cement and porcelain and metallic fillings are often erroneously blamed for giving rise to pain. If a pulp is very small, as the result of anatomical overgrowth or developmental defects of the hard parts, or is habitually anemic as a result of systemic disturbances, any rise of blood pressure in it may induce pain. It is first dysesthetic, then hyperesthetic, and then hyperemic, and lesions of the vascular system may follow, leading ultimately, if long continued, to fibroid degeneration, death, and gangrene.

The causes of these obscure forms of odontalgia may be divided into congenital and acquired.

Of the former it may at once be said that it is extremely rare. The signs and symptoms are as follow: Severe pain in apparently normal teeth, generally occurring in girls and women, which are

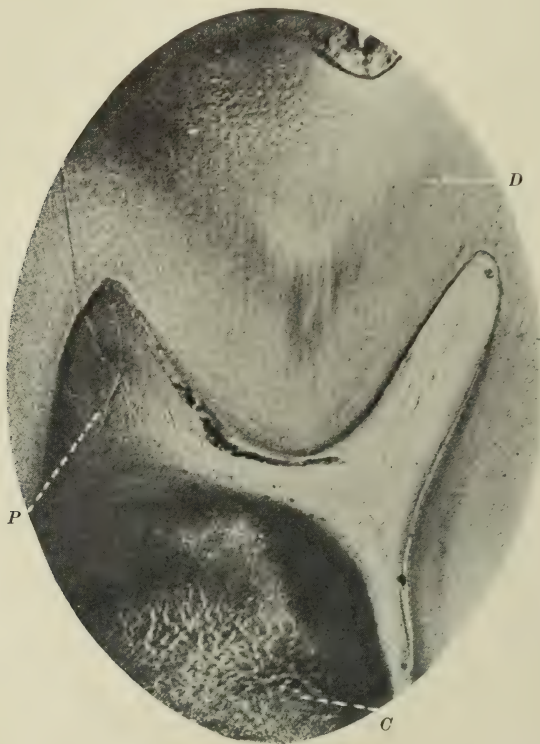
agonizing in character and practically resistant to dental therapeutics. There is no obvious lesion.

If a tooth is removed and examined microscopically it may happen that a marked congenital defect can be noticed. If the pulp is too small for the tooth—if the area of the pulp is diminutive and

stituents of the blood is altered at these periods.

Thus, it has been proposed by Dr. Blair Bell⁽¹⁴⁾, in the July *Proceedings* of the Royal Society of Medicine—who claims that the metabolic processes concerning the calcium economy exercise an all-important influence upon the genital

FIG. 9.



Longitudinal section of molar showing small size of pulp and great thickness of hard parts. (History of tooth narrated in text.) D, Dentin. P, Pulp. C, Cementum.

that of the hard parts unduly large, indicating that enamel and dentin have been produced at the expense of the soft tissues (as in Fig. 9)—the increased blood supply would probably be attended by pain, partly because the small size of the pulp reduces its trophic influences on the teeth itself, partly because of the hydrostatic congestion that has taken place, partly because of the absence of a collateral circulation, and partly because the character of the chemical con-

functions and are necessary factors therein—that the well-known vaso-dilatation which occurs in the combs and wattles of laying hens is due to the drop in (*i.e.* loss of) the calcium contents of the blood, whereby a sort of chilblain condition is produced.

If vaso-dilatation or local hyperemia can occur, as suggested, in the peripheral organs of the hen, it is conceivable that a rise of blood pressure in the pulp can also be produced in similar circum-

stances. Such a case, to which allusion has been made, occurred in the practice of a friend of the writer, to whom he is indebted for the following particulars:

Notes on a Case of Obscure Cause of Pain.

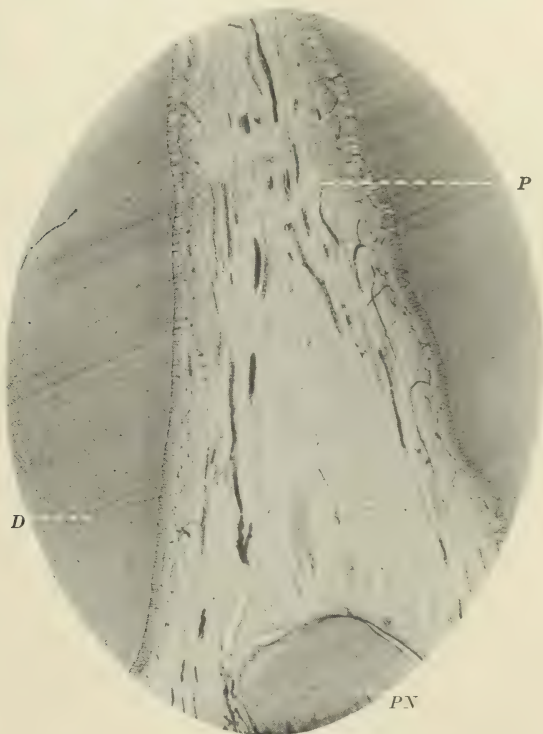
October 14, 1906. Miss A., age fourteen. No caries. Pain experienced along the upper

the blood. I therefore put her on a course of calcium lactate. I saw her three weeks later, when I ordered her to continue the treatment for a full six weeks in all, and have not seen her since."

The dental pain gradually departed.

May 1, 1907: For four days patient complained of intense pain in the left mandibular second molar. Tooth tender on percussion;

FIG. 10.



Longitudinal section of premolar of child. P, Pulp. D, Dentin. PN, Pulp nodule.

and lower jaws on the left side. All teeth were painful on pressure and slightly loose. Pain in joints. Saliva acid. Pain more intense during cold or damp weather.

Diagnosis: Rheumatism of jaws.

The patient was sent to a physician, who reported: "Patient suffering on October 24, 1906, from slight rheumatism and hyperchlorhydria. The latter was rapidly cured by the administration of magnesium peroxid. . . . Later on (June 1907), when I saw the sections of the patient's teeth, I thought that the trouble might be due to deficiency of calcium salts and a lower coagulability of

affected by temperature. Local and internal remedies of no avail for any length of time.

Diagnosis: Presence in pulp of pulp nodules.

May 7th: Extracted tooth: Too tender to bur out. Tooth submitted to microscopical examination; no pulp nodules on sectionizing. (See Fig. 9.)

June 7th: Great pain in left mandibular first molar; symptoms as before. It was thought the condition might be due to extra blood pressure in the pulp. Tried all local and internal remedies as before. The only thing that relieves the pain is abstraction of blood

by leeches, but the effect is only for a few hours.

June 20th: Extracted tooth. Sent the patient again to the physician to have blood tested.

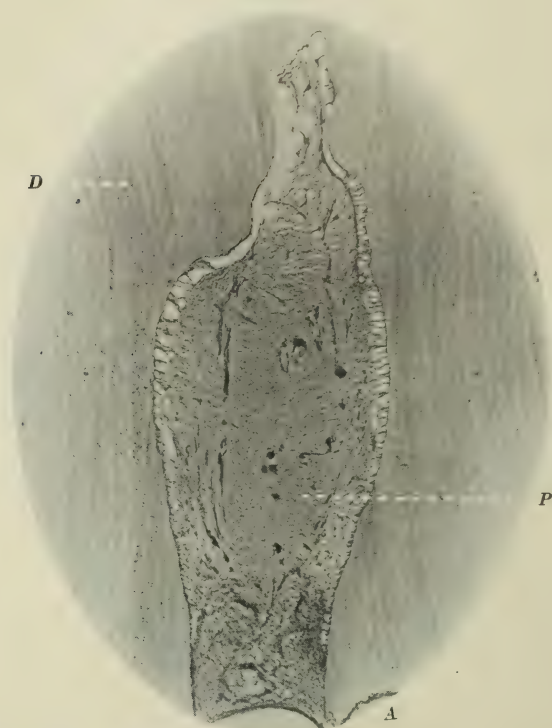
Between last date and March 1908 patient complained of pain on and off in the left maxillary second molar, but the physician's treatment *after three doses* generally relieved the pain.

June 11th: Great pain all night in the tooth. Applied aconite and iodine, with no result. Drilled into canals left open, then applied a light dressing.

June 12th: Pain getting worse; patient up all night; tooth very tender. Extracted tooth. Canals were all open; two roots covered slightly with glairy exudation, one of them having a slight nodule and slight absorption.

The gums were always normal—never in-

FIG. 11.



Longitudinal section showing fibroid degeneration of pulp in deciduous incisor. *D*, Dentin. *P*, Pulp. *A*, Abraded area of dentin.

March 12, 1908: Great pain experienced in left maxillary second molar; insomnia. Applied leeches, with some relief. Found a small pinhole cavity, but drilling gave rise to intense pain. Patient had an anesthetic and then the pulp was drilled into. Great relief followed, accompanied by much hemorrhage. This having ceased, I removed the pulp under cocaine pressure anesthesia. The root-canals were very small. Filled them with light dressing, with temporary gutta-percha in cavity.

March 19th: Filled root-canals with "oxpara" and filled the tooth.

jected or tender, except in the last instance, when they were slightly tender.

PHASES OF DEGENERATION.

Acquired lesions are those of the vessel walls induced by such systemic disturbances as are found in anemia, chlorosis, gout, marasmus, etc. Here we find more or less permanent injury done to the coats of the arteries and veins, resulting in hemorrhage, thrombosis, chronic en-

darteritis, calcareous degeneration, and so on.

If calcareous degeneration in the form of pulp nodules (see Fig. 10) or attached newgrowth occurs, and is profound, the symptoms are similar to those of developmental origin, but the result of the treatment is not the same, inasmuch as extraction of the apparently sound tooth immediately cures the odontalgia.

If the former conditions exist there is little if any pain complained of. The patients are young children, but the pulps are approaching senility, as is evidenced by their exhibiting various phases of reticular atrophy or fibroid degeneration. (See Fig. 11.)

This degeneration is extremely common, and is probably due, as a complication, to thromboses of the capillaries and veins, and as a result the impairment of the vaso-motor mechanism, which leads to vaso-dilatation and diseases of the vessel walls generally⁽¹⁵⁾.

CONCLUSIONS.

In conclusion, these remarks on non-carious and non-apparent lesions of the pulp may be epitomized by saying that, as this organ is influenced pathologically by general diseases of the nervous and vascular systems, obscure cases of odontalgia should always be regarded from the standpoint of the physician as well as of the dental surgeon; and that, if there is a marked personal or family history of gout, rheumatism, or allied conditions, pulp nodules may be diagnosed; if the patient is anemic, chlorotic, or marantic, or recovering from a long febrile disease, early stages of fibrosis may be suspected; also that hyperesthesia or dysesthesia is indicated when a patient is neurotic,

or neurasthenic, or subject to "nerve storms," or is suffering from a form of nervous excitability or exaltation, or perhaps exhaustion.

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RECENT PROGRESS IN ORAL SURGERY.

By **TRUMAN W. BROPHY, M.D., D.D.S., LL.D., Chicago, Ill.**

(Read before Section III of the National Dental Association, at the annual meeting, Birmingham, Ala., March 31, 1909.)

IN presenting to you a report on the progress recently made in oral surgery, I desire to call your attention, in the brief period of time that is allotted me, to some important procedures which may be advantageously employed in practice. Among them I will include—

- (1) Intra-oral operations.
- (2) Prosthesis following operations.
- (3) Deformities removed by cosmetic operations. Plastic surgery, including paraffin injections.
- (4) Anesthetic agents.
- (5) Bismuth paste in the treatment of chronic suppuration.

If the subject of dental pathology and modern ideas of oral surgery were better understood by students of medicine, if the curricula of the medical colleges included these subjects, which they unfortunately do not, with very few exceptions, there would not be so many unsightly scars exhibited as the result of operations performed in a manner unwarranted. Every practitioner has observed conspicuous scars and disfigured faces due to surgical operations performed by men who did not understand the pathological conditions which they were attempting to treat. I exhibit to you photographs of patients who have been treated in this manner (see Figs. 1 and 2) by surgeons of good repute, who presumed that such operations were indicated, but did not know the real cause of the morbid condition present. Diseases of the teeth are more prevalent than any other diseases known to mankind, and when we are impressed with the fact that medical students are not given an oppor-

tunity in the regular course of instruction to acquire a knowledge of the many pathological conditions to which the teeth are subject, it is not at all surprising that so many serious errors are made by them, as practitioners, in caring for oral diseases which afflict their patients.

The photographs which I have passed to you show the effects of incisions made by surgeons, presumably for the treatment of caries or necrosis of bone, but which in fact were operations for the cure of sinuses leading from dento-alveolar abscesses. The treatment of necrosis and caries of the maxillary bones never calls for external incisions. The entire mandible may be removed within the mouth; so, too, may the bones of the maxilla be removed without external incisions. Tumors of enormous size, involving the maxillary bones, may be removed without dividing the external soft parts.

Operations for treatment of trigeminal neuralgia which involve the second and third divisions of the fifth nerve may be successfully treated without external incisions, and the nerves removed at the foramina through which they pass at the base of the crania. It is not necessary to state, however, that intra-cranial operations for the purpose of removing the Gasserian ganglion call for external incisions. Such operations are rarely indicated. They are not made as frequently as formerly.

PROSTHESIS FOLLOWING OPERATIONS.

An interesting article recently appeared from the pen of Dr. Carl Beck

of Chicago, entitled "Plastic Reconstruction of the Lower Jaw," which reads in part as follows:

The removal of a portion or of the whole mandible has its effect on the functions of the jaws and the form of the face. The effect on the functions of the removal of a portion of the jaw will depend greatly on the part of the bone removed and its size. If a small

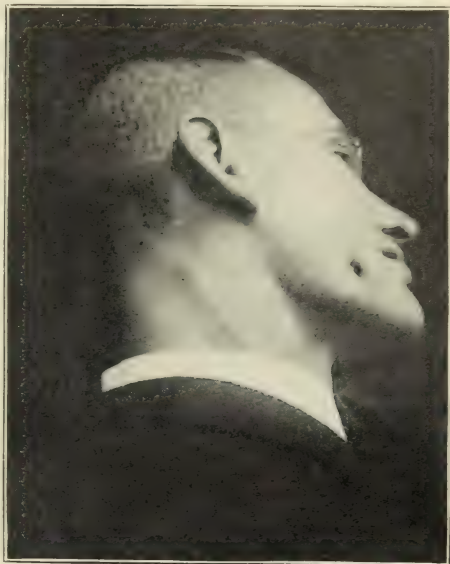
bility of preventing such deformities by the proper treatment during operation.

There are many indications for operations on the mandible which call for a partial removal of the bone. Inflammatory conditions which lead to necrosis of the bone, and especially tumor formations, are the main causes for such operations. If a resection is made it is the duty of the surgeon to see that the part removed is in some way re-

FIG. 1.



FIG. 2.



portion of the middle part of the jaw is removed the function may not be disturbed at all. If half of the ramus is removed, the mastication and the speech may be greatly impaired, and if the whole jaw is removed, the function of the lower jaw will be entirely abolished. Even a small resection, however, will have an effect on the shape of the face, which as a rule will be shown by disfigurement or deformity.

The jaw plays such an important rôle in the formation of the face through support of the cheeks and the prominence of the chin that the symmetry of the face and the esthetic effect is greatly disturbed if a part is missing. This is shown in those cases in which, through lack of or asymmetry of teeth, or through atrophic changes, the face becomes disfigured.

These points have to be taken into consideration in cases of operation on the lower jaw, more especially on account of the possi-

placed by some resistant tissue which will give support to the soft structures and which at the same time will allow motion. It will be necessary to replace the removed bone by some material which will give to the face normal expression and shape. The best method at present is the replacement of the removed structures by foreign bodies in the shape of dental plates. A plate which holds the teeth and imitates the shape of the jaw is well borne within the mouth, ordinarily causes very little irritation, gives to the soft structure a support, and restores the shape and symmetry of the face. Many surgeons, among them Bardenheuer of Cologne, have tried to restore a jaw by autoplasty, but the results are not very gratifying. The majority of experienced men have decided in favor of the prosthesis. Difficulties arise, however, when the prosthetic appliance is to be put in place some time after the operation, because the deformity and impairment of func-

tion takes place immediately with the removal of the bone.

Dr. Claude Martin of Lyons, France, a dental surgeon of great ability, was the first to give to us a method of removing the jaw without causing disfigurement or impaired function. Although he was not the first one to expound the idea, he was the first to apply the method practically, and a large number of patients operated on with good results are a proof that his method is practical and successful. He prepares a prosthetic appliance before he removes the jaw, or part of it, and implants it at the time of the oper-

FIG. 3.



ation in the cavity remaining on the removal of the jaw. The appliance is made of hard rubber, with a complicated system of channels through which the cavity, which naturally secretes a great deal of pus, can be irrigated and kept clean. This hard rubber prosthesis is only temporary, and is replaced later by the permanent dental plate with teeth—which can be removed for cleansing purposes and carried in the same manner as the ordinary plate after the removal of the teeth—which hinges on the alveolar process. Each individual case requires an individual plate, so that no such plate can be bought from a manufacturer. Some operators have objected to this method in some particulars, although they accept the principle of it, namely, that a prosthetic appliance is necessary, but as material they have used metal instead of hard rubber. Boenneken and Patsch of Breslau have suggested the use of metal splints; the former suggested a wire splint, the latter a plate which can be cut

to a desired size and fastened into the jaw when needed. Of course this means that the splint can be applied only in median resection, but when one-half of the jaw is resected clear up to the joint, the metal appliance is out of the question. Martin's method, however, allows even in these cases, or in cases of total removal of the mandible, the application of a prosthetic appliance. The accompanying illustration [shown] is from photographs of two models which I received from Claude Martin, through the kindness of Dr. Carrel, and which represent the average case of a central and lateral resection.

In my experience in the treatment of patients for whom I have removed a portion of the mandible, I have learned that even when half of the bone was removed, if the remaining half be held in place so as to prevent it drawing over toward the opposite side, which always occurs by muscular contraction, the normal occlusion of the teeth of this remaining half with the upper teeth may be preserved, providing the surgeon holds the teeth of this part in occlusion with the upper teeth until cicatrization of the wound is completed and well set. It is necessary to hold the remaining part of the lower jaw so that the teeth will occlude with the upper ones at least two months in order to make their permanent occlusion certain. I exhibit to you a cast (Fig. 3), a counterpart of which was first brought to my attention by Professor Martin of Paris at the Fourteenth International Medical Congress at Madrid, Spain, in 1903.

Horse-hair sutures, which may hardly be regarded as of recent origin as surgical sutures, are highly appreciated by those who have employed them. In their use in hare-lip work I have found that no suture scars are left. I have found, too, that if the surface of the lip be kept dry and free from dressings, the wound heals, usually with greater satisfaction, and we have not so frequently interruptions of union.

I exhibit a form of *adhesive plaster* which has *hooks* adjusted in it, in such a way that in the adjustment of the dressing adhesive strips are placed on both sides, and then the two strips are laced together after the fashion of lacing

a shoe. These strips admit of removing the dressings, if used, without removing the adhesive plaster, the act of which often repeated is painful, as it will irritate the skin and excoriate it.

DEFORMITIES REMOVED BY COSMETIC OPERATIONS; PLASTIC SURGERY, INCLUDING PARAFFIN INJECTIONS.

Since the introduction in 1900, by Professor Gersuny, of paraffin for the purpose of removing depressions of the face which have occurred as the result of surgical operations or loss of tissue from any cause, leaving a depression that will change the facial contour, this agent has been extensively utilized. I have used it quite generally, and have succeeded in restoring the facial contour in patients for whom the half of the mandible was removed, bringing out the angle of the jaw and the depressed tissues anterior to the ear so perfectly that the loss of the bone would scarcely be recognized. This paraffin may be advantageously used, with most happy results, in cases of deep depressions at the ala of the nose in aged people following the loss of the cuspid teeth or whenever occasion requires restoration of facial contour.

It is absolutely essential in the use of paraffin that the skin be made as thoroughly clean, by means of an antiseptic solution, as possible, and that the greatest precaution be observed in having everything attending the procedure most carefully sterilized, as an infection within the tissues following such an injection would be most disastrous.

ANESTHETIC AGENTS.

Nitrous oxid, as you all know, was the first anesthetic employed. When Dr. Horace Wells introduced it to the profession he conferred upon humanity its greatest boon. The dental profession is justly proud of his remarkable achievement. The popularity which was accorded to nitrous oxid in general surgery for a brief period was to a great extent supplanted by the introduction of ether, and subsequently chloroform. Nitrous oxid was thought to be useful for op-

erations requiring only a little time; it was therefore lightly regarded for major operations. Within the past few years nitrous oxid administered with oxygen has been employed for prolonged operations, with marked success. Surgeons have been drawn to it by reason of its comparative freedom from danger to life.

The new methods of administering nitrous oxid with oxygen by nasal inhalation have made it possible to maintain anesthesia sufficiently long and satisfactorily to perform any operation. Recently Dr. F. K. Ream of Chicago administered it for me in an operation in the mouth requiring an hour and twenty minutes for its completion. Prior to this administration, I was of the opinion that nitrous oxid and oxygen might serve the purpose for other than oral operations, but that operations within the mouth could not be performed by its use, since the inhalation of atmospheric air would counteract the effect of the gas and render complete anesthesia impossible. It was gratifying to me, however, to perform this long and difficult operation while the patient was under the influence of nitrous oxid.

The experiments recently conducted by Drs. Walter H. Hamberger and Fred E. Ewing of Chicago—presented in the Section on Surgery and Anatomy of the American Medical Association at Chicago, 1908—on the blood changes incident to surgical anesthesia, with especial reference to those induced by nitrous oxid, resulted in bringing out the following conclusions:

(1) In an analysis of the blood changes incident to nitrous oxid anesthesia in a series of clinical and experimental observations we find that—

(a) The hemoglobin is not permanently reduced nor is anemia produced.

(b) Hemolysis is not increased.

(c) The changes in the readings of the hemoglobin and erythrocytes are transient and of no surgical significance, and are most likely to be explained on the basis of capillary stasis. The production of reduced hemoglobin is not a result of the anesthetic itself, but is due to the accompanying asphyxia.

(d) The changes in coagulation time are not constant, but in general there is an increase in the time required for clotting, most marked about the third day.

(2) In an analysis of the blood changes incident to ether anesthesia in a series of experimental observations we find that:

(a) The hemoglobin is slightly reduced and therefore a slight anemia is produced.

(b) Hemolysis is not materially increased.

(c) The changes in hemoglobin and erythrocytes are to be explained on the basis of blood inspissation.

(d) It causes a marked decrease in the coagulation time, most marked from the seventh to tenth days.

(3) In an analysis of the blood changes incident to chloroform anesthesia in a series of experimental animals we find that:

(a) The hemoglobin is reduced, and therefore an anemia is produced.

(b) Hemolysis is increased.

(c) It causes a slight decrease in the coagulation time, most marked in the seventh to tenth days.

(4) In a comparison of the three anesthetics from the standpoint of the blood changes, we conclude that nitrous oxid causes no permanent effects of any significance; that ether causes more harmful changes (slight anemia and marked decrease in coagulation), and that chloroform causes the most harmful results (hemolysis and production of distinct anemia).

BISMUTH PASTE IN THE TREATMENT OF CHRONIC SUPPURATION.

It is to the credit of Dr. Emil Beck of Chicago that the profession has been put in possession of a most valuable therapeutic agent in the form of bismuth paste. It is well known that subnitrate of bismuth is an opaque substance; Dr. Beck conceived the idea that if subnitrate of bismuth were injected into a sinus it would enable him to make a skiagraph, and thus clearly outline the course of the sinus, with its origin. To his gratification, following these injections into the sinuses the suppuration ceased and the wound healed, and within a short time the patient was cured. Since this time he has been employing bismuth paste extensively in the treatment of chronic suppuration wherever

found. His brother, Dr. Rudolph Beck, taking up the work of treating pyorrhea alveolaris, has found that suppuration will cease in a very short time and the tissue surrounding the pockets will change from a congested appearance to a normal color. It seems to be necessary, however, after the suppuration has ceased, to stimulate the surfaces of the tissues so as to promote the formation of granulations, thus closing the pocket with new tissue. I exhibit to you a syringe and some of the paste. I have found bismuth paste especially desirable in the treatment of the antrum of Highmore.

I have been in the habit for many years of making a large opening in the antrum through the canine fossa and removing the polypi which are usually present in chronic cases; then, after keeping it open and well cleansed for about a week, I fill the cavity completely full of bismuth paste and let it so remain about a week, when it will again require refilling, as I have found that the paste will be more or less contracted. In the presence of the bismuth, suppuration will cease, and the walls of the cavity, except in malignant cases, will assume a normal condition.

In the January 1909 number of the *Dental Review*, Dr. Rudolph Beck published a preliminary article on the use of bismuth paste in the treatment of pyorrhea alveolaris. This method consists in injecting a warm liquefied bismuth-vaselin paste into the pus pockets of the teeth affected with pyorrhea alveolaris. For this purpose an all-metal syringe is employed, holding about a half-ounce of the paste, provided with a flexible, tapering, blunt point, made of pure silver, platinum, or gold. The paste consists of: Bismuth subnitrate, 30 per cent.; vaselin, 60 per cent.; paraffin, 5 per cent.; wax, 5 per cent. It is prepared as follows: The vaselin, paraffin, and wax are boiled, and the bismuth subnitrate is added and stirred in as soon as it is taken from the flame. The syringe is then charged with the liquid paste, the point of the needle introduced into the deepest part of the pus pockets by gentle and steady pressure,

and the paste is so injected that it reaches all diseased crevices of the pocket. Dr. Beck says:

I do not remove any of the deposits previous to the first injection. At the next sitting I remove all deposits and useless teeth, also remove or correct all obstructive materials, such as ill-fitting crowns or fillings, cleanse and polish the teeth to be retained, and ligate them with strong non-elastic material. Then I make a second injection and have the patient return in two days. The injections hereafter are repeated every other day until the discharge stops, and the tissues resume a healthy condition. The frequency of the injection varies according to the pathological condition present, and is determined in each case individually. This method of treatment has been employed by me in a large number of cases of pyorrhea alveolaris, and the results hereby obtained are far superior to those obtained by any method I have heretofore employed, so that I do not hesitate to recommend it to the profession. Among these cases are many of long standing which had resisted former treatment, and which after a few injections of bismuth paste entirely cleared up. The results were not at all surprising to me, since I knew what could be accomplished with the paste, having for several years observed its application by my brothers in chronic suppurative sinuses, and I desire to quote their explanation of the factors which produce these favorable results. Dr. Joseph C. Beck states in a paper published January 2, 1909, in the *Journal of the American Medical Association*, the following: "Either the metallic bismuth or the nitrate coming in contact with the diseased tissues produces a local leucocytosis and changes in the connective tissue cells, both of which destroy the vegetable organisms. When the bacteria are destroyed, the disease process undergoes resolution, provided no foreign body—sequestrum—or necrosis be present."

In general surgery, where large quantities of this paste are injected, there is a possibility of its being absorbed, causing symptoms of chronic intoxication similar to those of

lead poisoning. This can hardly be considered a danger in dentistry, where the paste is used in such small quantities and is not liable to absorption. Experience with this paste has certainly proved very gratifying, and I trust the dental profession will give it an earnest trial. Although not sufficient time has elapsed to form final conclusions as to the permanence of the cure, the method should be tested and then given its proper place in the treatment of pyorrhea alveolaris.

* * * * *

CONCLUSIONS.

(1) The injection of the thirty per cent. bismuth-vaselin paste into the pockets of pyorrhea alveolaris is a remedy far superior to any thus far employed.

(2) The same paste injected into the fistulæ of chronic alveolar abscesses or sinuses of the jaws produces a rapid closure of the same, provided every recess of the sinus has been reached, and no sequestra are present. Tubercular sinuses are no exception.

(3) The secretions of the sinuses change their character after injection; they become serous and the micro-organisms gradually diminish and finally disappear.

(4) Bismuth subnitrate is a bactericidal and chemotactic substance which is slowly eliminated.

(5) By its retention in pus pockets and not being acted upon by saliva, it prevents further infection and decomposition.

(6) No serious complications due to bismuth absorption need be anticipated, since 100 grams of the paste are rarely used. In larger doses it may produce symptoms of ulcerative stomatitis with black borders around the gums.

(7) As a dressing in cavities it is preferable to any other; inasmuch as it promotes healing of chronic suppurations and rapid formation of granulations.

(8) Where systemic disease is the underlying cause of the pyorrhea, the general treatment in connection with the local is imperative.

A PLEA FOR THE WIDER UTILIZATION OF WHAT IS KNOWN IN FILLING TEETH.*

By G. V. BLACK, M.D., D.D.S., Sc.D., LL.D., Chicago, Ill.

(Read before the Pennsylvania State Dental Society, at its annual meeting, held at Pittsburg, June 29, 1909.)

UNFORTUNATELY I gave the title of this paper before I had written it, which is contrary to the good old rule that a title should express the principal thought included, and therefore should be written last. In the writing it has seemed necessary to give so much time to one phase of the subject intended that the title has become somewhat incongruous. I found that the length of the paper would be much too great if all of the subjects intended were included. With this apology I will give principal attention to caries of the enamel and injuries to the gingivæ, directing attention to the evil results of a failure to give that subject and its correlated conditions the necessary attention. Some other subjects that seem much neglected will receive shorter mention. The subject of injuries to the gingivæ, while one of the oldest in dentistry, is also one of the newest, because of its general neglect, and because of the recent development of a better knowledge of the evil results of such neglect.

The greatest drawback in the progress of practical operations in filling teeth is the general failure of the dental profession to make a careful study of caries of the enamel, and to make use of the knowledge which this affords in the preparation of cavities. Generally, in our schools, there is a short course of lectures on dental caries, directed almost exclusively to caries of dentin. Generally caries of enamel is only mentioned, or is passed over in such a way that the student

fails to consider it of special importance. The practical facts are exactly the reverse. Caries of enamel is the initial lesion without which caries of dentin does not occur. In all treatment of dental caries with a view to its eradication and cure, the attention of the operator should be directed especially to caries of enamel, the strict localization of its beginnings, and the conditions under which it spreads on the surface of the enamel.

It is now generally known that caries of dentin is caused by micro-organisms that grow into the dentinal tubules after the enamel has been broken down. It is also generally known, by those who have given this matter careful laboratory study, that there are many varieties of micro-organisms in the superficial layers of decaying dentin, and that as we proceed from the superficial to the deeper layers the number of varieties diminish until in the deeper layers there will be but two or three varieties, sometimes but a single variety; as the deepest layers of softened material are cut away, none at all will be found when the work has been done with sufficient care. That variety found the deepest in the carious mass has generally been the streptococcus salivarius, or caries fungus, so called—the *Alpha* fungus of Miller's earlier work. As there are several varieties of micro-organisms found in the mouth and in carious dentin any one of which has physiological characters which seem to fit it for producing dental caries, and as these are found growing in association,

* This paper was illustrated by about sixty lantern slides.—Author.

the question of pure culture may properly be eliminated. It has been found, however, by Miller, in his original studies published in 1884, that a single variety in pure culture was capable of producing all the essential characters of dental caries. After Dr. Miller, and essentially following his methods, I have made similar observations confirming his findings.

All of the organisms entering into the active production of the original lesion in caries, *i.e.* the solution of the calcium salts in the process of softening of the dentin, by their growth produce acid fermentation in the presence of the hydrocarbons such as sugar, starch, etc., and it is this acid product that is responsible for the solution of the calcium salts. This acid is produced within the dentin by the growing organisms. Acid produced and dissolved in the saliva has no effect in producing caries. Acid saliva is of no consequence whatever in relation to dental caries. Persons immune to caries have acid saliva just as persistently as those susceptible to caries.

Caries of dentin is hidden away within the tooth, and unless the opening into the decayed area is broad, is beyond outside influences. It is true that the organisms causing it must receive sugar from the saliva, but this is obtained by osmosis, or through the process of dialysis, the softened dentin acting as the dialyzing medium. Hence for caries to progress in dentin there must be an opening to the surface, but the progress is more certain if the opening is small.

Caries of enamel, on the other hand, begins on the surface. The enamel is a solid; it has no natural openings into its substance. Micro-organisms never enter the enamel. The micro-organisms causing caries of the enamel must lie upon its surface until the enamel rods have been loosened and fall out, in this way admitting micro-organisms to the dentin. In order that they may act in the production of caries they must grow upon the surface of the enamel under conditions which will prevent the acid which they form from being freely dissolved in the saliva, and thus dissipated and its effect lost. This has been abund-

antly shown by the many cases in which caries of enamel has occurred under bands placed for orthodontia operations and allowed to remain too long, some part being imperfectly cemented. I have seen this occur in mouths of persons who had never had any other decay in their teeth, and often in positions on the surface where otherwise caries does not occur. In these cases the band serves to protect the micro-organisms growing under it from washings by the saliva, from displacement by the crush of food in chewing, and allows the acid which they form to act directly upon the calcium salts of the enamel. Something similar must occur in every case of beginning caries of the enamel, hence we find that caries always has its beginning in the enamel in the out-of-the-way places upon the teeth, such as in the pits and fissures of the occlusal surfaces where colonies of micro-organisms may grow, covered in and protected by food débris or gummy material not soluble in the saliva. In the proximal surfaces of the teeth it occurs in places hidden away between them just gingivally of the contact point, where a little lodgment may occur and colonies of micro-organisms be allowed to grow undisturbed, covered by gummy material that protects the acids which they form from solution in the saliva. Or more rarely, decay begins near the free border of the gum on the buccal surfaces at the point where there is the most frequent lodgment of gummy material and débris. Caries never attacks the enamel in the open, where the surface of the tooth is freely cleaned, exposed to washings by the saliva and to the crush of food over the surfaces in chewing. Therefore decay of the enamel beginning on the surface is strictly limited to certain areas of tooth-surface, and superficially cannot spread beyond those areas in any case where the person is making normal use of the teeth in chewing food. This is the cause of the limitation of the beginnings of caries to these limited areas. These areas may, upon examination, be mapped out very certainly in any mouth, and we shall find that practically all beginnings of caries on the surface

of the enamel will be confined to them. Therefore the beginning and the superficial spreading of decay of the enamel is subject to these purely local conditions even in the most susceptible persons.

In caries of dentin there are no such limitations to the spreading of decay. As soon as the enamel is penetrated, decay spreads (1) along the dentinal tubules toward the pulp, and (2) along the dento-enamel junction in every direction from the point of beginning. This spreading is within the tooth; it is hidden away from outside influences and will go on to the complete destruction of the crown of the tooth. During this spreading the enamel will be undermined and will decay from within outward—backward decay of enamel—will be weakened, and break away. This must be held constantly in mind as being distinct and apart from the superficial beginnings of caries of enamel, or the spreading of the beginnings of caries on the surface of the enamel. There is practically no spreading of decay laterally within the substance of the enamel. It follows the length of the enamel rods to the dento-enamel junction.

If we now turn our attention to the directions and the extent of the spreading of decay on the surface of the enamel, we shall find it favored or hindered, or actually prevented, by certain local conditions. In all normal conditions of the mouth and normal uses of the teeth in chewing food, the extension of caries on the surface of the enamel is strictly limited to certain well-defined areas.

In occlusal decay occurring in pits, there is no spreading on the surface of the enamel. The decay, beginning in the depths of the pits, penetrates to the dentin and at once spreads in that tissue, undermining the enamel, which slowly crumbles from backward decay. Therefore the treatment of these cavities is the simplest of all occurring in the mouth. The requirement is that the undermined enamel be cut away to sound dentin, the decay removed, all deep grooves leading into the cavity cut out to a point where a good smooth finish of the filling may be made, the pulpal

wall squared up, making the cavity of box form, and the enamel walls being well smoothed. In more extensive decay when the marginal ridges of the occlusal surface are more closely approached, the directions of the enamel rods in the enamel walls must be looked to, and such form given them that no short ends of rods be left at the cavo-surface angles. Here the spreading of caries on the surface of the enamel, after the filling is made, is not feared. Perfect work in the preparation and in making the filling will give perfect results. Many of these fillings fail after a time, however, because the pulpal wall is left rounded, which increases the difficulty of placing the filling and permits comparatively easy movement under stress.

In decay in proximal surfaces the conditions are more complex than in any others, and require the closest study on the part of one who would become master of the conditions found. In these surfaces cavities beginning on the surface of the enamel will be narrow occluso-lingually as the rule, but occasionally conditions are found in which they become broad. In the bucco-lingual direction they will be narrow or will be broad, according to the combined breadth buccolingually of the contact point and of the near approach of the tooth-surfaces. Then the extent of the spreading will depend upon the forms of the teeth primarily, and secondly on the condition of the gingivæ filling the interproximal space. No decay begins on the enamel under a free border of healthy gum tissue anywhere.

The function of the interproximal contact is to divide the food in the crush between the upper and lower teeth in mastication, and to protect the interproximal gingivæ. A part of the food will escape through the lingual embrasures and a part through the buccal embrasures, and by this motion will clean the angles of the teeth and prevent caries from beginning upon these angles or spreading across them in any case in which the mastication of food is normal. A count of cases in which there was spreading of decay across the angles of the teeth was

made in the Northwestern University Dental School in 10,000 persons, in which number only eight such cases were found. Each of these was a person who had been practically unable to chew food because of some interference for from one to three and four years. This shows plainly the value of the angles of the teeth as a place near which to lay enamel margins in the preparation of cavities.

This statement brings with it the necessity for a close study of the several parts of what is usually termed the interproximal space and the soft tissues which normally fill that space. In order that this study may be a detailed one, each part must be known by name. The contact point in its best form is made on rounded prominences upon the teeth that touch each other as would two marbles brought in contact—only minute portions of the surfaces touch. The interproximal space is a triangular opening between the proximal surfaces in which the base of the triangle is on the alveolar septum of bone, and the apex at the proximal contact. As much of this space between the proximating teeth as is normally filled with the interproximal gingivæ is called the interproximal space. Then, as the teeth round away from each other to the buccal and to the lingual, there is a space between their angles not filled by the interproximal gingivæ. These openings are called the embrasures—the buccal embrasures and the lingual embrasures. The contact point, the interproximal space, the soft tissue filling the interproximal space, and the empty embrasures to either side, make up the form elements. These in their relations to each other may be of good form, or bad form, or intermediate.

That form that will most completely protect the interproximal gingivæ and at the same time afford the best conditions for cleanliness, or for cleaning the greatest portion of the exposed tooth surfaces during the mastication of food, is the best form. These are such as are found in bell-crowned teeth, or teeth that are broad occlusally and have narrow necks, and therefore wide interproximal spaces. These will generally present deep embra-

asures with the interproximal gum tissue, rounding up smoothly to the contact point, over which food will run very freely during mastication, cleaning the greatest possible part of the tooth-surfaces not protected by gum tissue. In these, such proximal decay as occurs will be narrow bucco-lingually, and in treatment by filling, the cutting of very broad cavities will not be necessary. Here, however, a most important but variable factor is the completeness of the interproximal gingivæ. If this has wasted, or has been destroyed in part by violence, a broader area of tooth-surface will be exposed and imperfectly cleaned. This will require different detail in the cavity preparation to meet the conditions and to protect the greater exposure of tooth-surface from future decay. For this purpose the prepared cavity must be broader bucco-lingually, and often more extended gingivally. In no case must surfaces unprotected by healthy gum tissue that are in such close apposition that food will not run freely between them in mastication be left in cavity preparation. The cavity outline must include such areas.

In the opposite condition, in which the teeth are very squarely built, the thickness at the gingival line approaching more closely the thickness mesio-distally at the contact point, broad flat surfaces lying in near approach to each other, the contact point broad bucco-lingually, the interproximal gum tissue thin between the teeth and on that account more susceptible to injury, we have the worst forms that may be regarded as normal. In these, decay beginning on the surface of the enamel is liable to wide bucco-lingual spreading superficially on the enamel, because of the greater breadth of the near approach of their surfaces. The contact point itself is apt to be broad, and is more liable to catch and hold stringy foodstuffs which will injure the gum septum. This ensemble of conditions calls for broad cutting bucco-lingually in the preparation of cavities, for the reason that the spreading of decay on the surface of the enamel will be wider in these directions. Observations in cases in which fillings have been

made and decay has recurred at the buccal and the lingual angles, especially in cavities rounded gingivally, show a lamentable neglect by operators.

It should be distinctly held in mind that colonies of micro-organisms will grow on the fillings made, whether they be of gold, amalgam, gold or porcelain inlays, just the same as they grew upon the original tooth-surface, wherever the former conditions have been restored. These colonies will spread in the same directions, and unless the filling is broad enough to reach areas of surface protected and cleaned by the excursions of food in normal mastication, they will overgrow the margins of the filling, starting recurrent decay. Further, careful observation shows certainly that many fillings are being made in cavities in which the margins of decay, spreading on the surface of the enamel, have never been cut out. I have made these statements in greater detail elsewhere.

The breadth of the contact point may readily be measured with a fine ligature or thread. Pass this into the interproximal space, then bring the two ends together and hold them away tightly to the buccal or labial. The distance these are apart where they leave the teeth will show the width of the contact point occluso-gingivally. Now change the direction and hold them away to the occlusal or incisal, and they will show the breadth of the contact bucco-lingually. In any case in which the contact is right, the ligature will pass it with a snap in entering or in its removal, no matter whether this be the normal contact or the restored contact after finishing a filling. In any case in which a ligature drags between the contact points for some appreciable distance, or is held in its grasp, food is liable to be held and cause injury to the gum septum. Any such case needs immediate attention and improvement.

In the normal mouth there is a considerable wear of the contact points by the rubbing of one against the other in chewing food. From measurements made by Dr. Wedelstaedt, and repeated by myself, this appears to be sufficient at the

age of forty or fifty years to reduce the measurement of the arch around its curve, from the buccal cusp of one third molar to the buccal cusp of the third molar on the opposite side, about one centimeter, or a little more than the average width of a central incisor. This wear, when distributed equally among the thirty contact points in the arch, is normal, and does little harm. But it is often abnormal at particular points, especially between the first molar and second bicuspid, or between the first and second molars, where the heaviest work of mastication is done. Many of these cases of excessive wear may be noted that seem to do no harm. But it often happens that stringy foods are forced between these flattened points and held. This food is forced on to the gum septum, accumulates, ferments with acid formation, causing decay beginning at or near the gingival line, where it is very difficult to treat. Or, in other cases, putrefaction will occur and produce extensive injury to the interproximal gingivæ and associate parts. The dental profession, considered as a whole, seems utterly oblivious of these injuries, and especially of their cause. Hundreds of these are treated as pyorrhea alveolaris until the teeth are lost from injury to the periodontal membrane. Fillings made with flat contacts produce similar results. Many similar cases are started, where the contact points are not quite of good form, by accidental lodgments that have strained the teeth slightly apart, causing repetitions of the lodgment.

In all of these cases a reddening of the gingivæ and a little later a festooning of the gingivæ in the embrasures should lead to an investigation before actual destruction of tissue has occurred. This examination should point out the difficulty. If it is found that poor contact has been made in inserting fillings, new fillings should be made, and a proper contact restored. If it is because of excessive wear, a cavity should be cut in one of the teeth and be filled, after sufficient separation has been made to give a prominent contact point. If it is because of some accidental lodgment, espe-

cial care for a time may be sufficient to reduce the swelling of the gingival tissue, restore the tonicity of the peridental membranes, and effect a cure. Whatever the nature of the difficulty, it should receive careful and intelligent attention. Neglect of this class of cases means wrecking many dentures that should remain good and strong. Dr. MaWhinney, who has for many years given this subject especial attention, estimates that eighty per cent. of the cases of so-called pyorrhea alveolaris are started from these causes. In a large proportion of the cases referred to him by other dentists early enough for treatment, he effects a cure by mending the contact points alone, no treatment of the soft tissues being required. Those cases in which gingival abscesses have formed, or where the gum septum is otherwise very badly injured, will never completely recover, though by special care many of them may be restored to a degree of usefulness that is well worth the effort. I have never made any kind of operations for which my patients have been more grateful than these restorations of contact points.

I have had this operation in my own teeth, where the injury had occurred because of excessive interproximal wear. I know personally of the comfort it gives, and of the healing of some very ugly sores. I have recommended this, and continue to recommend the operation without hesitation, and I insist that it should not be neglected by any practitioner.

Besides the conditions mentioned above, dentists are very neglectful regarding injuries to the gingivæ during dental operations. Injuries by careless use of ligatures, especially in filling incisors, are doing immense damage. Very many cases of so-called pyorrhea alveolaris are due to that cause. The attachment of the gum to the tooth at the higher part of the curvature of the gingival line of the proximal surfaces is the common point of injury. Much injury is also being done by carelessness in separating teeth. There is no need of this whatever. Our mechanical separators are now such that by using ordinary care, separations

are easily made without injury, and with a minimum of pain.

The general failure of men to correct cases in which persons come to them with the teeth dropped together from loss of the contact point by caries, or from previous careless operating, is lamentable. These corrections require time in order that the necessary movements of the teeth may be slowly made. But by a few moments of attention once or twice per week the work is easily and well accomplished. The same inattention is seen continually in the placement of artificial crowns. A large number of these seem to be placed in "any old way," without a thought as to whether the interproximal gum tissue has space for a normal existence or not. Over and over again the eye of the ordinary observer is offended because of the improper relation of even the incisors in width, and the necessary bad appearance of the gum tissue that has been mutilated in the operation.

We should not forget that in the treatment of dental caries we are working for a special end, immunity from caries, for the great majority of our patients. Enough of careful observation has now been had for us to be certain that for most persons immunity to caries will occur at an age of from twenty to thirty years, without regard to the degree of earlier susceptibility, if the teeth are kept in condition for such use, and are used with normal vigor in the chewing of food. This should be looked for, it should be worked for. The teeth of patients should be watched, and the habits of patients in chewing food should be watched and directed to that end. Nothing should be allowed to interfere with the vigorous use of the teeth. If there is pain in chewing, do not rest until the cause is removed.

Among the mechanical difficulties in filling teeth the failure of dentists to fully realize the force of occlusion of the human teeth stands as a prominent factor. In this there are two errors of thought: (1) A failure to realize the actual force, and (2) a failure to realize the results of the repetitions of such force day after day in its repeated applications for many years together. There is no

reason why we should not so fill teeth that in the mechanical sense the fillings will stand practically for a lifetime. But only a few of the many operators are utilizing methods that are known to give such results. All may do so. For twenty years it has been known that the force of occlusion of the human teeth varies, say from forty pounds to three hundred pounds on the first molars. A collection of trials in one thousand persons, taking good and bad without any selection, gave an average of one hundred and seventy-one pounds. The variation was from thirty to two hundred and seventy-five pounds. Among the number of persons there were fifteen whose full measurement could not be had, because of the limitations of the instrument used—275 pounds.

Any architect, or any one of you, would, if you were building a house or any structure requiring strength, prepare a foundation at right angles with the stress, and be careful of the strength of its different parts. In no case would you rest such a structure on a rounded foundation. The habit of making rounded cavities for the reception of fillings in teeth is a relic of the old idea of cleaning out holes in teeth and filling them, with but little knowledge of the forces involved, or of the actual treatment of caries of the teeth by the use of fillings. With our present knowledge, cleaning holes in teeth, leaving them rounded, and making fillings is no longer tenable, even when in the mechanical sense the operation is otherwise well executed.

The fact often noted, that in individual cases fillings so made have stood for thirty, forty, and even for fifty years, fails as an argument in their favor when it is now so well known that the great mass of fillings so made are lost within from three to ten years. That such fillings made in rounded cavities fail to protect the teeth from recurrences of decay in cases of considerable or in many cases of even moderate susceptibility to caries, because they do not include the area of liability to caries, is equally well known. For this reason there is no justification for the continuance of this method of operating.

Men are careless in the keeping of records of their operations. How many of you are keeping records of your filling operations in an intelligible way? How many of you know, or can say from records which you have kept from year to year, what proportion of the fillings you have made have been made in cavities previously filled by yourself or others? How many of you know, or can give a statement from your records, how many of your own fillings have failed that you made in 1899 for those patients who are still depending upon you for the care of their teeth? How many of you are making records of the conditions you find when patients for whom you have previously made fillings present for examinations? These items are as much the practice of dentistry as the extraction of a painful tooth, and as much a duty.

With this I have probably said enough for you to realize my intent. I am not a pessimist in dentistry. I do not believe that dentistry is going backward. On the other hand, I believe that we know more dentistry today than ever before, and that we are doing better dentistry than ever before. But yet we have many men who are not doing their full duty to the public, and I believe the time is ripe for a general war on careless operating.

First, it is the duty of every dentist to keep his information abreast of the times, that he should know the best thought of his profession, and that he should give his serious study to the questions involved. In other words, he should know dentistry as completely as his individual powers will allow; then he should put it in practice honestly and carefully every day. No careless work is admissible when dealing with the sufferings of men. This is no time for doing things so-and-so because the older men did them so. How would the business man of today fare if he should do business on the plans of his fathers? Business plans of today are a hundredfold more effective than they were in my early manhood. How would the physician or surgeon fare if he should attempt to

practice as his fathers did? The whole field of physics and of surgery has been revolutionized and rendered much more than a hundredfold more effective since I have been actively following its development. What I wish to see in dentistry is a determined effort among all of the better men to stimulate more

effective practice. In this I am no stickler for my own ideas and plans of operating, or for those of any other man. That which I want most is more earnestness in acquiring a working knowledge of what is known in dentistry, and more earnestness in putting the best thought into practice.

SYPHILIS AND ITS MANIFESTATIONS, ESPECIALLY FROM A DENTAL STANDPOINT.

By **NORMAN H. MYERS, D.D.S., Plymouth, Pa.**

(Read before the Susquehanna Dental Association, at its forty-sixth annual meeting, Harvey's Lake, Pa., May 18, 1909.)

AFTER spending considerable time in looking over the various subjects usually presented at dental conventions, I concluded that it would not be amiss, but would be in keeping with the progress of the dental profession, to present for your consideration and discussion a paper on the above-named subject. Not that I feel that I am an authority on this matter, but that I might bring before you for our mutual study and enlightenment a subject which has been very much neglected by the dental profession. This subject should be of paramount importance, as it vitally concerns us as dental practitioners, our *clientèle*, and people generally.

Syphilis is designated a venereal disease, and is usually acquired by impure intercourse, but it can be contracted in many other ways, as I shall refer to later on in my discourse. It is termed venereal because the word is derived from Venus, the mythical goddess of love. I do not know what people were affected with it first, or when or where it had its inception, but records show that it has been known to the medical profession since several hundred years before Christ, and I can state with almost positive cer-

tainty that the disease existed during the time of Moses, judging from his description of an infectious disease in the book of Deuteronomy. In the middle ages this disease was extremely prevalent, so much so that at the end of the fifteenth century it ravaged the people of Europe like an epidemic of smallpox.

Syphilis is particularly a disease of the human family, and it is stated with some degree of authenticity that its prevalence is universal, with but slight exceptions. Experimenters have endeavored to inoculate the inferior animals with syphilitic virus taken from human subjects, but have met with little or no success. Some claim that they have succeeded in inoculating the monkey, but the almost unanimous testimony of experimenters is that the monkey, notwithstanding his intimate relationship with man, is not susceptible to this curse of the human family.

It appears that syphilis is one and the same disease the world over, without respect to race or color, differing only in severity, which severity is due mainly to climatic and social conditions; yet the most favorable conditions of climate are powerless to prevent the prevalence of

syphilis, when filth, poverty, ignorance, and neglect of sanitary regulations prevail. As to the influence of climate upon the virulence of syphilis, it is generally conceded—all things being equal—that the mild, even climate is more favorable to the successful treatment of this disease than sudden and extreme changes of temperature and moisture.

Syphilis can be acquired in any way in which the virus from the ulcer can come in contact with living tissue either through abrasion or through cracks or fissures in the skin, but as long as the true skin is not denuded of its protection, the epidermis, one may handle this virulent matter without fear of inoculation.

Owing to the prevalence of this disease in all classes of society, it behooves us as dental practitioners not only to acquaint ourselves with the literature bearing upon this subject, but to especially familiarize ourselves with its oral manifestations, so that by observing the proper precautions as to our hands and instruments, we can the better guard against personal infection or against communicating the disease to another person.

If we are faithful to the trust imposed upon us, we will reverently and thoughtfully guard against any condition that might arise that would mar the peace and happiness of our patients or those depending upon them.

We are all cognizant of the fact that among all the pathological conditions to which human flesh is heir, few are dreaded more than syphilis. This intense dread is not wholly due to the severity of the disease, but largely to the subsequent consequences appertaining to the individual affected, and to the mental and physical degeneracy of his offspring. There are but few men with hearts susceptible to good impressions who would not plead guilty at the bar of their own conscience when they witness daily, in their own flesh and blood, convincing evidence of their own guilt, or who would not feel tempted to inflict bodily harm to another, if by his neglect he were guilty of that offense.

As a note of warning against possible

infection from the oral cavity, allow me to suggest the use of a good antiseptic mouth-wash before performing any operation in the mouth—especially is this indicated when any morbid lesions are observed. In this matter of preparation for an operation, we as kinsmen of the general surgeon are forced to acknowledge our unworthiness of that relationship, and at times are obliged to pay the penalty of our negligence by a fine imposed by the courts, or suffer the misfortune and humiliation of being ourselves inoculated with the toxic virus of syphilis.

The general surgeon who would perform an operation without first having thoroughly sterilized the respective parts would be looked upon with contempt by his contemporaries. Can we neglect so important a duty without feeling, at least, a sense of condemnation?

If self-preservation is nature's first law, would it not be expedient for us, who come almost daily in contact with syphilis, to so familiarize ourselves with every sign and symptom peculiar to this disease, especially as manifested in and about the oral cavity, as to be able to recognize it at once and dispose of it accordingly.

To facilitate the diagnosis of syphilis as manifested in the oral cavity, let us compare it with epithelioma, as the latter disease presents practically the only morbid phenomena on the oral mucous membrane having a marked resemblance to those of syphilis. (See opposite page.)

For convenience, syphilis is divided into three stages, namely, primary, secondary and tertiary, the first two stages being known as the active stages, while in the third or tertiary stage we regard this disease as being in a latent or subdued condition, showing no active surface manifestations.

The etiology of syphilis is not definitely known, but the consensus of opinion among experimenters is that it is of spirochætic origin, owing to the presence of such a micro-organism in all manifestations of acquired syphilis, either accidental or experimental.

COMPARISON.

Syphilitic sore.

- (1) Lips of women, seldom men.
- (2) Lymphatics involved before ulcer is formed.
- (3) Hard base of chancre will disappear in a few weeks under anti-syphilitic treatment.
- (4) Ulceration follows induration.
- (5) In syphilis one or more ulcers are formed.
- (6) Ulcer is found on the back of the tongue, tonsils, and palate, the primary stage excepted.
- (7) Glands are rarely enlarged.
- (8) Ulcer has softer but sharp edges.
- (9) Ulcer gives little or no pain.
- (10) Ulcer raised with unbroken flat top.

Epithelioma.

- (1) Men more frequently than women, between the ages of forty-five and fifty.
- (2) Ulcer formed before lymphatics are involved.
- (3) Cancer always presents a hard base, and the ulcer never heals entirely.
- (4) Induration follows ulceration.
- (5) In cancer one ulcer is formed.
- (6) Ulcer is found on the side of the tongue usually, but more frequently on the anterior than the posterior.
- (7) Glands are nearly always enlarged in cases of long standing.
- (8) Ulcer has hard edges.
- (9) Ulcer is very painful.
- (10) Warty growth with a broken inflamed cauliflower-like surface.

At the Sixth Congress of Dermatologists, held in New York city, September 1907, E. Hoffmann made a report showing the actual state of our knowledge on the microbiology of syphilis, and arrived at the conclusion that *Spirochæta pallida* beyond doubt is the pathogenic agent of syphilis, either from contact or by heredity, and that its presence indicates syphilis as clearly as the presence of Koch's bacillus indicates tuberculosis.

Syphilis, like tuberculosis, can be inherited from the parents. It may be transmitted from father to child by the presence of the spirochæta in the spermatic fluid; or from mother to child by the presence of this pathogenic agent in the ovum or by the simple passage of the germs through the placenta. This transmission through the placenta is scarcely possible under normal conditions of that organ, but during morbid conditions it loses its power of resistance, and infection of the fetus in this way is made possible.

The offspring of syphilitic parents are affected with the syphilitic virus and the toxic products of maternal syphilis.

The effect of hereditary syphilis on the fetus depends upon the intensity of the virulence in the parent or parents just prior to conception. If these lesions be extensive and very pronounced in their

manifestations, abortion or intra-uterine death of the fetus will ensue.

Of all the diseases of which we have any record, syphilis produces the greatest number of abortions, and causes the greatest number of deaths among children of youthful age. The infantile mortality from this disease is appalling and should demand the careful attention not only of the medical and dental practitioners, but of our legislators as well. Statistics gathered by specialists on venereal diseases show that eighty per cent. of the children born to parents affected with syphilis in its active state die before reaching their second birthday.

If the syphilitic virus becomes somewhat attenuated in the parents, pregnancy may go on to completion, yet the child will rarely ever escape the symptoms of syphilitic infection, usually manifested by gummatous alterations. Some such children come into the world bearing specific evidence of the guilt of the parent or parents, while in others this guilt presents itself later on in infantile life, the time varying from the first day after birth up to the first or second year.

Sufficient statistical evidence has been accumulated through observation, research, and experimentation to prove that syphilitic lesions, whether on the surface or deep-seated, are virulent and infec-

tious, even if the disease be of long standing. From the statistics already at our convenience, we are safe in drawing the conclusion that the infectious power of syphilis is indefinite. Yet the attenuation of this disease in the parent can be greatly influenced by the lapse of time, wholesome food, and favorable climate and sanitary conditions. The above-named attributes will not in themselves destroy the spirochætic micro-organisms of syphilitic infection, but will so ameliorate the general physical condition by reinforcing the vital energy in the individual affected that the tissues of the body will be better prepared to successfully antagonize the propagation of the germ which produces the syphilitic phenomena in the physical economy.

It is not within my province to say much about the treatment of syphilis, but I would advise you to refer all such patients to their medical adviser for treatment.

If the parents have been properly treated, it is possible to destroy the spirochætic germs so that healthy children can be born to the parents and be void of the germs of infection; but these children may inherit the toxic products of syphilis from the mother, which usually do not affect the child until adolescence, when the morbid para-syphilitic changes will appear.

These changes are of syphilitic origin but not of a syphilitic nature, and will become so attenuated by succeeding generations that they will finally disappear.

In regard to the dental organs, syphilis has a most deleterious influence. The effect is the same whether it be of paternal, maternal, or conjoint origin, the lesions varying according to the severity of the disease.

Before going into details regarding dental lesions of hereditary syphilitic origin, it would be well to consider carefully the time in which the so-called cap of dentin appears on the different papillæ under normal conditions.

First dentition.

In incisors and canines: 17th week.
First and second molars: 18th week.

Second dentition.

First molar: 25th week.
Incisors: First month after birth.
Canines: Third and fourth month.
Bicuspsids: Sixth month.
Second molar: Third year.
Third molar: Twelfth year.

If we bear in mind that hereditary syphilis is most active and virulent during the last month of the intra-uterine life and the first three months of extra-uterine life, we will be able to more fully comprehend the pathological metamorphism in the development of the dental structure resulting from a perverted or disturbed nutrition.

The extended lesions can be directly ascribed to syphilis, their magnitude and depth depending upon the intensity of the disease. In describing the dental lesions characteristic of hereditary syphilis, we shall denominate them "dental erosion," but will not take the time to differentiate between dental erosion and chemical erosion, as most of you are familiar with the latter.

Permit me to say, in passing, that dental erosion is seldom observed in the deciduous teeth in normal dentition, but in certain stages of hereditary syphilis, tardy, morbid dentition is the rule rather than the exception.

If the disease in the embryo be of such a character and the uterus be so tolerant as to permit the embryo to escape abortion, then the chances are that the first dentition will be so delayed that some of the deciduous teeth will bear evidence of dentinification during the most active syphilitic period of intra-uterine life. Under such conditions, syphilitic manifestations are inevitable, if not in all, yet surely in some of the teeth of the deciduous set.

Granting that dental lesions of the syphilitic type are quite familiar to most of us, I will not enter into an elaborate description of them. Fournier says: "Dental erosion is a kind of apparent wear of the tooth. Upon superficially examining a tooth thus affected, it seems to have been carved or mechanically worn off with an instrument. It reminds one of the appearance of worm-eaten wood

or of marble corroded by an acid, and this appearance suggested the word erosion.”

Just how this erosion takes place is a matter of conjecture. Until the scientist has given us conclusive evidence of its formation, we shall be obliged to regard any hypothesis with suspicion. The consensus of opinion among scientists is that dental erosion is formed during the intra-follicular period, and is caused by hereditary syphilis of the morbid systemic type. The time of formation and the character of dental erosion is also fairly definitely known.

The teeth that are usually affected by hereditary syphilis are the incisors, canines, and first molars of the second dentition. The reason for this is that dentinification takes place in the first molar about the sixth month of intra-uterine life, and in the incisors and canines during the first three months of extra-uterine life. As this period coincides with the most active period of hereditary syphilis, you can readily see why these teeth should be most affected.

The bicuspid, at times, show indications of this malady, but the second and third molars are usually immune from dental erosion, as they dentinify between the third and twelfth year after birth, at a period when the morbid systemic condition is attenuated or has entirely disappeared.

Dentinification and calcification, after a certain period, are contemporaneous, therefore any morbid condition affecting the dental follicle would affect the tooth formation.

Dental erosion presents three distinct forms, namely, pitted, grooved, and cuspal erosion.

Pitted erosion is usually formed on the labial surfaces of the incisors, and particularly the upper incisors, but is not confined strictly to these teeth. In color it shows a dirty gray or almost black. The pits usually appear in horizontal lines, with healthy tooth tissue between. Some pits are superficial, while others extend entirely through the enamel.

Grooved or sulcate erosion usually presents a single horizontal groove, but occa-

sionally we see several parallel grooves of unequal depth, with healthy tooth tissue between. The groove is near the cutting surface of the anterior teeth, leaving very little or no enamel protection on the cutting surface. Owing to the vulnerability of this cutting surface, it is soon worn off, and the tooth is shortened.

The morphology of cuspal erosion may be different in different teeth. In some teeth it is laminated, in others serrated, while in others it is amorphous. These different forms of erosion are confined almost exclusively to the upper third of the incisors, canines, and first molars, while the lower two-thirds may be healthy and of normal development. The most marked manifestation of hereditary syphilis is exhibited by the third type of cuspal erosion. This is due to calcification taking place in these teeth at a period when hereditary syphilis is at its worst, namely, the last month of intra-uterine life. This type is familiar to most of us, but difficult to describe, the lower two-thirds of the tooth being normal in size and development, and the upper third being smaller and irregular in development. In the first molars the line of demarkation reminds one of a grafted tree with a scion of slower growth. In some teeth this upper third tapers to a point, while in others it has a very irregular contour and cuspal ending.

The occlusal surface may have fine or deep serrations, or vertical grooves forming many conical projections, which soon wear away under the stress of mastication, leaving a polished concave yellowish interior, and a rim of white enamel on the exterior. The tooth then presents the appearance of an old or short tooth prematurely worn out.

There are many other hereditary syphilitic manifestations of the oral cavity which might be mentioned, but I will close by thanking you for your patient indulgence and thoughtful attention.

Note: I am indebted for valuable information to Hoffmann, E. Fournier, Schaudinn, Hutchinson, and Cavallaro.

THE EVOLUTION OF TOOLS.

By A. H. THOMPSON, D.D.S., Topeka, Kans.

(Read before Section III of the National Dental Association, at the annual meeting, Birmingham, Ala., March 31, 1909.)

"THE tool was man's first scepter: It asserted his royalty over Nature."—*M. de Pressensé.*

NATURE is both prodigal and niggardly in her dealings with man. Prodigal in furnishing for his use many simple things that are necessary for the maintenance of his existence, and niggardly and reluctant in surrendering the more secret materials and forces that have contributed so much to the wonderful advancement of civilized man. Primitive man utilized the simple things that nature furnished ready to his hand, and they were sufficient for his wants, while civilized man, by his intellectual powers and scientific knowledge, wrings from her reluctant hand the means for producing the wonders of this marvelous age. But from her great storehouse, nature supplies both savage and civilized man with the indispensable means of gratifying his requirements. Her manifold products are his resources, and her mysterious forces are harnessed to do his will. Nature was a benefactor to primitive man, but civilized man has made her his slave. Without the simple resources she placed in the first men's hands, life would have been impossible, and the new race would have perished from off the face of the earth. It would have been a catastrophe akin to that which overtook whole groups of animals in past geological ages.

The primeval industrial life of the human race must therefore be considered first in the light of what nature provided ready-made for existence against antagonistic conditions. These simple things placed the balance of power in his hands, and he lived. Without them he would

have perished, and the earth would have remained the wilderness of animal and plant life that it was before the advent of man. We must therefore contemplate the capability of that primeval troglodyte, that man-ape who was utterly incapable of creating implements and weapons from the materials around him. He was capable of using in a simple simian way the gifts of nature as they came from her hands, without any artificial modification whatever. Kindly nature gave him these resources to supplement the waning powers of his natural organs, which were being rapidly modified in the process of his psychic evolution. Having lost valuable weapons in the reduction of his teeth and claws, he must needs adopt external aids to enable him to survive amid the hostile conditions in which he found himself placed. What the primeval man-ape was losing in physical organization as compared with other animals, he more than equalized in the development of ability to utilize the materials that nature supplied ready to his hand. From that point the departure of man from his simian ancestors began.

Among the important gifts with which nature aided struggling primeval man may be noted first those which were furnished by the vegetable kingdom. Like his near relatives, the quadrumana, simian man was probably arboreal in his habits, or partially so at least. Many of man's rudimentary structures point to the fact of such an existence. The apes of today furnish examples of the transi-

tional stage, such as that when primeval man gradually became a terrestrial animal in the process of his evolution. This primitive arboreal life first taught him the use of such products of the vegetable kingdom as the limbs, fruits, etc., of the trees, which might be employed as tools and weapons without modification. These were the missiles and clubs ready to his hand. The development of the grasping powers of the hand checked the growth and caused the reduction of the jaws and the teeth as prehensile and fighting organs. The hands were evolved by climbing, and an accidentally broken limb left in the grasp would suggest its use as a missile or a club. This is the natural automatic action as observed in monkeys. The club, therefore, either for striking or throwing was a natural weapon. Nature kindly placed this most effective and typical weapon in the hands of primeval man at the very first and most critical stage of his existence. His survival as a species probably depended more upon his discovery of the club and its use at this time than upon any other agency. It gave him a new resource, and placed the balance of power in his hands. It enabled him to dominate over other animals, and we probably owe our preservation as a species to the discovery of the club and its subsequent modifications. When we consider the reduction of the jaws and teeth as weapons in man, and recognize that without such external resources to supplement his waning powers he would probably have succumbed in the struggle for existence, we must admit the importance of the timely discovery. The first *pithecanthropus* who broke off a limb and used it for a missile or a club was the genius who saved the race from extinction. With this weapon he became a formidable enemy and more than a match for the destructive animals which menaced him. The evolution of the club down to our own times, with all its modifications, is a most interesting history, and shows the eventful rôle that this weapon has played in the development of the race.

Next to the club came the stick for throwing, which would early suggest it-

self by accidental discovery in the first place, in the first struggles with wild beasts and wilder men. From this were evolved the boomerang, the knobkerry, and other throwing-sticks which are constructed upon such scientific principles as are surprising among the very primitive people with whom they are found. Primitive man would soon discover the difference between a sharp stick and a blunt one. With a sharp stick he could better pierce animals to kill them, and dig in the ground to reach roots and grubs. With a very slight advance in intelligence he learned to sharpen the stick, but that important step placed him beyond the stage of the man-apes, and he became a man. With still further advancement he hardened the point of the stick in the fire, and later on attached still harder points of stone or bone. From this simple weapon was developed the spear and arrow and their relatives, but all originated from the sharp stick found ready to his hand. In this category belongs the sharp thorn, from which was developed the awl, the needle, and the pin.

In the mineral kingdom, we again find nature's kindly provision most fruitful. Stones of various forms and densities were furnished ready to the hand of primitive man, which could be used for pounding or for missiles. With the stone as a hammer, he reduced refractory food substances, such as nuts or bones, and thus secured food. As his teeth and jaws had been much reduced, the stone hammer came as a saving resource. The stone also served an important purpose as a missile for defense or to kill animals for food. As a missile the stone did not undergo as great an evolution as it did as a hammer in early savage life, but in modern warfare the missile has become by far the most important and efficient weapon. These ready-made weapons were necessarily adopted at a very early stage, as we know of the *quadrumana* throwing stones as missiles. When man attained the stage of modifying and shaping stones to make them more effective as implements and weapons, he began to sustain life more easily, and even to acquire some

luxuries. When we consider the multifarious forms of stone implements and their innumerable uses, we must acknowledge a debt of gratitude to old Mother Nature for her beneficence in placing such a very useful material in the hands of primitive man. Without the indispensable mineral substances, he could have progressed but little beyond the merest savagery. If the vegetable kingdom supplied the first resources for the preservation of his life at the first emergence of man from the animal stage, then did the mineral kingdom supply the means for the next step, the advancement to the stage of improved savagery.

The stone as a hammer developed great possibilities in the process of its evolution from the mere natural pounding implement. With the birth of inventive and mechanical powers, it was early modified to meet various purposes by chipping and grinding into many and varied forms to serve the demands of life. The hammer is still important as a tool in reducing substances that contribute to the wants of man, but with all its modifications its relationship to the primitive pounding-stone can be readily traced. As Tyler states in "Early History of Mankind," "Mere natural stones, picked up and used without any artificial shaping at all, are implements of a very low order, yet from this lowly origin all hammering tools were derived." That stones as simple pounding implements were long in use unmodified by man is demonstrated by such savage tribes as yet survive which are without artificially formed stone implements, but use cobble stones for pounding for all purposes. This is illustrated by the customs of the Seri Indians of Sonora, Mexico, on the Gulf of Lower California. Of them Prof. W. J. MaGee says (Bureau of Ethnology Report): "The Seris lack essentially the tool sense. Practically, they have but a single tool, which is applied to a remarkably wide variety of purpose—the natural cobble, which is used for crushing bones, severing tendons, grinding seeds, rubbing face-paint, or for weapons, etc. This many-functioned tool is but a water-worn pebble, and is arti-

ficially shaped only by wear, or use, and is summarily discarded when a sharp edge is produced by fracture. Cobbles and similar stones are found in quantity on their range and in their ancient shell mounds, with an occasional rudely shaped arrow-head, but not a single knife of stone or other wrought substance has been found." The offices of the pounding-stone in cracking nuts, in breaking bones, crushing shell-fish, etc., quite early revealed new food resources and thereby extended the possibilities of life and of survival. These possibilities stimulated invention also, and led to the attachment of a handle to a well-adapted stone, and thus to other methods of increasing usefulness. It is interesting to note also what the lowest degree of savagery is in the manufacture and use of stone implements. This is furnished by the Tasmanians, who were in the beginnings of the stone age when discovered. Mr. H. Ling Roth says of them in his "Aborigines of Tasmania": "Fragments of rock, either natural or artificial, are treated in one way only, by striking off small flakes all along the edge on one side only. This is, however, done with such skill as to keep the edge straight and sharp. None of the implements were furnished with handles, but were made to hold in the hand only. None of them were even ground." Mr. Tyler says, in his preface to Mr. Roth's book: "If there have remained anywhere up to modern times men whose condition has changed little since the stone age, the Tasmanians seem to have been such a people; they stand before us as a branch of the negroid race illustrating the condition of man now in his lowest stage of culture. The workmanship of their stone implements repeated the condition of paleolithic man. The round cobble stone with one side chipped to an edge is a typical implement, which makes it appear that the Tasmanian was at a lower cultural stage than the primitive man of Europe, who was a skilful chipper of flint, as evidenced by the implements found in the drift and in the caves. An extraordinary ignorance of tool-craft thus prevailed among the Tasmanians previous to

their discovery by the whites. On the whole, the life of the Tasmanians may give us some idea of the condition of earliest primitive tribes of the old world, for there is no record of the Tasmanians having made a needle to sew skin, or drawing or carving like the primitive men of Europe."

The so-called "eolithic problem" has been a greatly discussed question among anthropologists of late. It refers to some rudely chipped flakes found in deposits before the age of the oldest known chipped implements, and antedates in history of workmanship the oldest artificial forms. These rude implements were described by Prof. George G. MacCurdy in the *American Anthropologist* for 1905 as "Roughly hewn pebbles and nodules and naturally broken stone showing work, with thick lustrous patina, found in early geological deposits. The discovery, in pliocene deposits, of incised bones first led to the finding of flints thought to have been chipped intentionally. The retouches and marks of utilization were most convincing." Other authors declared that they are mere natural chips, and that all of the marks could have been produced by natural causes. But they have been found in many places in the tertiary formations, and the evidence that they are artificial is generally accepted. They are often found with the remains of extinct animals of the tertiary age. The objects consist of chipped flakes, scrapers like spokeshaves, rude awls, daggers, etc. Prof. MacCurdy continues: "The hammer and knife were the original tools. Both were first picked up ready-made. A sharp-edged natural flake served for one and a nodule or a fragment for the other. They were produced by chipping so as to be held comfortably in the hand. The stock of tools increased with the slowly growing needs. As these multiplied the natural material was supplemented by the manufacture of artificial flakes. The marks are often the result of use. A natural sharp edge was used till it was dulled and was then cast aside. The signs of use were unmistakable. Thence accidental chipping led to the suggestion of artificial chipping, and

tool-making began. There are three groups of eolithic implements: First, thin flat fragments of flint, natural flakes with chippings and notches along the margins, producing at times rude points. Second, thin flat pebbles with edges chipped to serve as scrapers. Third, flints trimmed to be of dagger or poniard shape, with rimmed hand-part. These were mere natural fragments chipped ever so little to adapt them to an apparent purpose. At the next stage of culture, however, paleolithic man took large stones and nodules and made from them such implements as he desired, but eolithic man merely adapted such chips as he found ready to his hand. The transition from eolithic to paleolithic tools in some deposits is well marked, both kinds being present. The eolithic culture precedes the paleolithic culture in point of geological time, and thus pushes the age of man farther back into the tertiary, and evidences human existence at this early period."

A most important tool and weapon, the knife, was also the gift of the mineral kingdom. A flint chip picked up on a hillside where an accidentally broken rock had produced it was probably the first knife. Another accident disclosed how it could be made, and thence its evolution was assured. The discovery of the cutting flint was a great boon to primeval man. It opened up a vast field of resources, not only of means of procuring necessities, but for comforts and luxuries as well. Man could skin animals to make clothing, cut up flesh for food, and do many other things that were not possible before the discovery of this useful tool. As his inventive powers developed, many modifications of the knife arose. Here, again, the resources of nature supplemented the diminishing powers of jaws and teeth. Unlike the carnivora, he was not armed to procure and reduce flesh for food, but the knife came in to supply this deficiency, and gave him command of a new source of food supply. It is indeed probable that while man was originally a vegetarian, like most of the quadrumana, the discovery of the knife was the means of ex-

tending his diet and increasing his nourishment.

Archeologists divide the prehistoric period roughly into three principal epochs, according to the material from which man made his tools and weapons. These are as follows: First, the stone age; second, the bronze age; third, the age of iron. The *stone age* is again divided into two principal parts, depending upon the finish given to the stone implements as an indication of culture. These are (a) the paleolithic, the period of rough or chipped stone art, and (b) the neolithic, or polished stone period. The paleolithic or rough stone age was of the greatest extent, for it reached far backward into the limitless past, while the neolithic was comparatively recent. As has been said, "The first long chapter in the history of human effort and progress was written in stone." The paleolithic implements were merely chipped without polishing, and are found in glacial drift and cave breccia, as precious relics among living savage tribes, or as strays on the surface of the ground in all parts of the world. They are often worn or fractured by water action, and show surface matrix stains or the oxidizing of the elements, producing that vitreous appearance as evidence of antiquity called the patina. They have also sometimes tree-like markings, called dendrites, which are dear to the heart of the archeologist as indicating great antiquity. These markings are especially conspicuous on the implements found in glacial gravels or in the cave-earth with the bones of extinct animals under the thick stalactite floors where they have lain for untold thousands of years. Many rude implements of the paleolithic type have been found on the surface in this country which were probably not made by the recent Indians, as they were in the polished or neolithic stage. The Indians say they were made by their forefathers or their gods, and left for them to use. They were regarded with veneration and were often employed for ceremonial purposes; by ignorant Europeans, even, they were believed to be thunderbolts.

The neolithic, or polished stone age was characterized by the grinding and smoothing of implements, of which so many thousands have been found in all parts of the world. This came on gradually, of course, and laps over into the bronze and iron ages, and even down to our own day, for stone implements, as hammers and knives, are still used for simple purposes. It indicated an advanced stage of culture, for the people of this age had attained many comforts and even some of the luxuries of life. The American Indians, at the time of the discovery of America, were in the neolithic stage, for they ground their axes, although they used rough implements and weapons as knives and arrow-points as a matter of economy. The numberless stone implements found all over this country attest the industry of the Indians in their manufacture, and that they answered well for all the purposes of their lives. The wonderful carvings and sculpturing of stone of the temples of Mexico and Central and South America show the value of stone for such purposes, and obsidian knives and hatchets were not entirely superseded by the iron of the conquerors. But though still in the age of stone, the Indian was just emerging into the age of bronze, or rather copper. But he treated native copper and iron as stones, for he did not smelt the ore till the coming of the whites. He forged native copper but probably did not melt it. The neolithic culture is also illustrated by the remains found in the mounds, barrows, and lake dwellings of Europe, associated with the bones of recent animals. The Marquis de Nadailac, in his "Prehistoric People," says: "To the paleolithic age succeeded one of a very different kind, to which has been given the general name of the neolithic age. The extinct fauna had disappeared and in their places we find the bones of the ox, the sheep, the goat, and the dog. Man had ceased to be a hunter and had become an agriculturist and a shepherd. There are indications everywhere of new ideas and new modes of life. This progress is especially seen in the industrial arts. Metals, it is true, are yet

unknown, but side by side with roughly chipped tools we find for the first time hatchets, celts, small knives, and arrow-heads admirably polished by long continued rubbing with stone polishers. Much-worn polishers are quite numerous." Some of the implements are of most beautiful workmanship, especially those of Scandinavia and Mexico. Implements and tools of bone, finely made, such as fine needles, awls of bone, and carvings on bone are characteristic of this period. Baked pottery also appeared, as it was unknown in paleolithic time. Civilization in many of its phases took great strides in the neolithic age, much of which was due, as in all ages, to the better workmanship and effectiveness of the tools employed.

The next period was the age of *bronze*, "during which," says Mr. J. A. Worsaae in his "Antiquities of Denmark," "a greater degree of civilization was introduced into the country, and by this means all previous relations were completely changed. The people were now in possession of two metals—bronze (a combination of copper and tin) and gold. They possessed woven cloth, handsomely wrought and ornamented weapons and shields, and bronze tools gradually supplanted implements of stone, which, however, continued for a long time to be used by the common people. Hunting and fishing gave way to agriculture, and cremation of the dead prevailed. Bronze implements have been found in great numbers over nearly the whole of Europe in barrows, lake dwellings, bogs, etc. Instead of the simple and uniform implements and ornaments of the stone age, we meet suddenly with a great variety of splendid weapons, implements, and ornaments of bronze, and sometimes with jewels of gold. The transition is so abrupt that from the antiquities we are enabled to conclude that the bronze period must have commenced with the eruption of a new race of people having a higher civilization than the earlier inhabitants. As the bronze tools and weapons spread over the land, the ancient and inferior implements of stone and bone were naturally superseded, although the

general change was gradual." Mr. Paul du Chaillu, in his "Viking Age," says: "From the finds of beautiful and often costly antiquities of the bronze age and their great numbers, the fact is brought vividly to our mind that even before iron was discovered there existed throughout Europe a remarkable culture. They had attained a great proficiency in the art of casting. The models were sometimes made of wax and a clay matrix made around it. The wax was melted out, and the molten bronze was poured into the cavity, and the matrix broken to take out the sword or other object. Some of the daggers are marvels of casting, and large swords were made in one piece. These weapons often had their hilts ornamented or twisted with threads of gold." Hatchets, axes, chisels, awls, and all of the common implements took the same shapes that have come down to us, and attest the advance made in the improvement of tools during this age, and their adaptation to a great variety of work. Many of the tools were the models of those which succeeded in the iron age. The tool sense was highly developed, as is demonstrated by the well-wrought objects, which were made with a skill that is quite equal to the productions of today in some instances. The Indians of North and South America were just emerging into the age of bronze at the time of the discovery of America. They were in the neolithic or polished stone age and were just beginning to use copper. That they had a means of tempering copper is generally believed, for chisels of hard temper have been found. Still it is probable that the stone carvings of Mexico and Central and South America were made with stone tools, flint or obsidian. The latter stone was of universal service and effectiveness for all purposes. The native copper of Lake Superior was hammered into axes, chisels, knives, etc., which were of hard enough temper to be useful. The Indians had not yet discovered the art of casting or of making bronze alloy, but were probably just on the eve of it, and with such a resource their civilization would have taken on great advances in every direction.

The age of *iron* ushered in the historic period. Iron was probably brought from the East by the ancestors of the Scandinavians. Worsaae says: "The difference between the bronze period and that of iron is that they made use of iron for those objects which they had previously made of bronze, except the use of the latter metal for trinkets, jewels, etc. But the character of all the works of the iron period, both as to material and efficiency, and workmanship in general, is completely changed. The bronze period was in all probability supplanted at a comparatively modern date, since all the objects of the iron age exhibit the influence of a more modern civilization. The close of paganism is clearly reflected in the iron period. Weapons of iron, swords, battle-axes, spears, arrows, armor, etc., were highly developed, and continued down to our own time in similar patterns. The common tools were multiplied, and shapes originated which we have today. Ornamental trinkets of gold

and silver were highly developed, as well as glass and enamel."

The iron period develops into the historic era, our own period, and from those that have gone before we have inherited the weapons and tools that we have in use today. Modern machinery was not known, of course, but the most elaborate tools of today can trace their genealogy back to those of the primitive savage. With a club, a cobble stone, and a flint chip, he met the problems of life bravely, and planted the seeds of civilization that made life for us possible. As we boast of our greatness in art and industry, let us not forget our debt to primeval man, who first discovered the modification of natural products to adapt them to his wants, and laid the foundation of the industrial achievements of humanity. We are the cultural heirs of a long line of artizan ancestors, reaching back through the ages of iron, of bronze, and of stone, far back to the first dawn of human handicraft.

CORRESPONDENCE.

HOT-WATER STERILIZATION FOR DENTAL INSTRUMENTS.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—Having frequently noticed in the journals various formulas for the prevention of rust during the sterilization of instruments, and having had conversations with dealers in dental supplies in which they repeated objections raised by purchasers of dental sterilizers, it might be useful to give the results of ten years' experience in sterilization of dental instruments by boiling water.

The laxity of a large part of our profession in employing any efficient method of sterilization is well known, and is a most lamentable condition to admit.

The omission of sterilization is not permissible legally or ethically, and the difficulties of hot-water sterilization are ab-

solutely trivial if properly equipped. Equipment for sterilization is as essential as a dental chair or engine. A hot-water sterilizer for dental purposes should be a copper pan nine inches long, five wide, and three deep, nickel-plated all over, and with riveted legs.

There should be a tight-fitting lid and a removable tray with a wire gauze bottom of fine mesh. Such an outfit can be purchased made to order at approximately five dollars. The sterilizer and the heater should stand in an aluminum pan to catch the drippings.

All instruments and handles must be of metal. With care in selection it is possible to make a complete outfit of all-metal instruments. Mouth-mirrors are

the only exception. I know of no acceptable boilable dental mirror and handle. I have made my own mirror handles of silver and use throat mirrors.

At the end of each day the sterilizer and all parts are carefully washed and a fresh supply of water is put in the pan. To this is added a heaping spoonful of baking soda—which may be purchased in packages at any grocery store. One charge of soda will run through the day unless the sterilizer is allowed to boil dry.

My ten years' experience has convinced me that there is absolutely no damage done to either the polish or temper of the instruments.

The essence of the whole matter is this: You cannot boil a rusty instrument without producing more rust, and you cannot rust a polished instrument by boiling, unless you forget the soda.

All instruments highly polished or nickel-plated will keep practically the original luster until worn out.

Before boiling old instruments they must be first polished and all rust pits removed. The first few boilings will

probably bring to light undiscovered pits, which must be polished out. A week's time with such care will give instruments that may be boiled indefinitely without damage, and which will be kept in better condition and polish than if not boiled. Nickel and silver never corrode under this care.

It is the invariable rule in my office that every instrument removed from the cabinet must be boiled before being replaced, and practically every dentist visiting my office compliments the condition of my instruments. This condition is entirely due to the fact that they are constantly boiled and kept clean. It takes no longer to gather up instruments and place them in a sterilizer than in any other pan, and it takes no longer to dry and replace them. The only time lost is the boiling time, and certainly any dentist can and must have duplicate pliers, mirrors, and favorite instruments to permit of decent treatment of his patients.

S. H. VOYLES.

St. Louis, Mo.

FEAR IN DENTISTRY.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir—In the October DENTAL COSMOS, pp. 1178-83, is printed a paper by Dr. W. T. Jackson, Cleveland, Ohio, read before Section II, National Dental Association, March 30, 1909, entitled "The Elimination of Fear in the Practice of Dentistry." The essay is interesting and instructive. The introduction especially interests this writer, to whom the methods of pain obtundence are practically unfamiliar.

On page 1179 he says: "After your patient is seated in the operating chair, proceed at once to allay her fear by assuring her that you will not hurt her. Do not stop here, however, for the chances are that she will not believe you, unless you explain just what you intend to do that she may not be hurt."

This paragraph revives personal and professional experiences.

The new patient should view on the instrument table only such instruments as are ready for immediate use in the contemplated first operation, and explanations of them should be made, with reference to offhand sketches and diagrams on the leaf or leaves of an empty foil-book, to make clear what is to be done and what avoided.

Teeth outlines showing enamel, peridentium, dentin, and pulp or "nerve" relations to the cavity under consideration will suffice to secure faith in your knowledge and ability. Follow on with the assurance that much of the work, though disagreeable, will be painless; but when hurt is necessary, due warning will be given and courage invoked. Begin

with enamel margin preparation; the lifting of leatherlike layers; the stream of warm water cleansing; and then, with keen excavator, or new bur in hand, utter the warning words, "Now, please!"—and the closed eyes, drawn breath, with hard gripping of the chair-arms, quickly ensue while the swift excisions of the sensitive peridentium lines are made, and not tearless, but fearless confidence is gained!

Children usually prove no exception to the persuading effects of sympathetic explanations and assurances.

A not infrequent incident has been that of a confident child, whose mother, seated behind the chair, might soon have tearful eyes from seeing the patient shrinking under my hands; when at a beckoning look from me she would come forward to find the child asleep, while the dentist,

with bent back and bowed head, completed that filling!

In lieu of the topics of common conversations in the office, it might well be worth while to introduce instructions to intelligent patients regarding the systemic scope and inclusiveness of dentistry with reference to the careful inspection and preservation of the deciduous teeth, as also the continual care and supervision of the permanent teeth, for the maintenance of health; the constant progress of human education, and the due regularity of the various occupations—all consequent upon frequent and regular consultations with the Doctor of Dental Surgery (or, soon, "Science").

W. STORER HOW, D.D.S.

PHILADELPHIA, PA.

DRYING-OUT THE INVESTMENT IN THE CASTING PROCESS.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—In the very comprehensive and interesting article by Dr. Ward, and its discussion, which appeared in the September issue of the COSMOS, I was greatly surprised not to find even mentioned what has always appeared to me to be a very prominent factor of error in the casting process. I refer to the process of drying-out the investment. What is the value in using exact formulæ, etc., in its mixing, if we are not going to be equally exact in the treatment of the completed investment?

Experience has demonstrated to me

that, in my hands at least, all of the investments upon the market which I have used are more or less liable to crack, and thereby become distorted, when heated over an open flame. When placed in an oven and heated to about 400° F., this tendency to crack is greatly reduced if not altogether eliminated.

It would therefore appear to me that Dr. Ward should have included this step in his casting experiments; but I may be wrong.

Very respectfully,

C. EDMUND KELLS, JR.

NEW ORLEANS, October 11, 1909.

PROCEEDINGS OF SOCIETIES.

NATIONAL DENTAL ASSOCIATION.

Thirteenth Annual Meeting, Birmingham, Ala., March 30 to April 2,
1909.

(Continued from page 1294.)

SECTION III: Oral Surgery, Anatomy, Physiology, Histology, Pathology, Etiology, Hygiene, Prophylaxis, Materia Medica, and Allied Subjects.

Chairman—C. C. ALLEN, Kansas City, Mo.

Secretary—J. W. HULL, Kansas City, Mo.

FIRST DAY—*Tuesday.*

THE first meeting of Section III was called to order by the chairman, Dr. C. C. Allen, Kansas City, Mo., at 8 o'clock P.M., Tuesday, March 30, 1909.

The first order of business was the reading of a paper by Dr. TRUMAN W. BROPHY, Chicago, Ill., entitled, "Recent Progress in Oral Surgery."

[This paper is printed in full at page 1384 of the present issue of the COSMOS.]

Discussion.

Dr. J. D. PATTERSON, Kansas City, Mo. It is very little that I have to say upon this admirable paper. The methods and appliances described are almost entirely new to me. What the essayist has said in regard to the treatment of pyorrhea with vaselin and bismuth subnitrate especially appeals to me, and having much to do with the treatment of pyorrhea, I certainly shall avail myself immediately of the treatment recommended so highly by Dr. Brophy and which has been proved to be valuable by Dr. Beck. In some cases we are annoyed by the slow healing of very advanced pockets, and a paste which is non-infec-

tious and bactericidal with which we can fill these pockets for a time will be very valuable for us.

There is another feature that especially appeals to me in regard to the treatment of the antrum after the operation. When the disease has been of long duration the polypi which are usually present must be removed, and the surfaces curetted, and usually, after curetting and cauterization, the cavity is packed with iodoform gauze and left in for from twenty-four to forty-eight hours; then the gauze is removed, and the wound dressed again. I have very often been annoyed with the irritation that results from packing of that kind, and am very glad to find some remedial agent which will take the place of the iodoform gauze, and will remain antiseptic, be germicidal and non-infectious, and give relief to the patient; for we cannot for many days keep the antrum packed with iodoform gauze or any of the usual surgical dressings. If we can fill the antrum with the medicament suggested and allow it to remain there without its becoming infectious, a great advantage is gained with scarcely any risk of irritation.

Adhesive plaster with eyelets is novel

and very good indeed, as are the other appliances illustrated, especially the splint for a broken jaw, which obviates many of the difficulties experienced heretofore.

In the beginning of his paper Dr. Brophy spoke of the possibility of making an operation upon the bones of the mouth without cutting from the outside. You and I have often seen a common dental alveolar abscess treated in that manner, prominent scars being the result, which are hard to get rid of finally, and we have wondered why a physician or a surgeon when any complication of that kind arises does not at least seek the advice, if nothing more, of an intelligent dentist. I have known physicians who appreciated perfectly well the fact that the dental surgeon should be consulted when any growth appears upon the jaws, any necrosis, or any swelling, but still they would go on with treatment and often make incisions from the outside of the face. I am not criticizing the physicians and surgeons, but it seems to me that while we know that "knowledge comes," "wisdom lingers" in their treatment of such cases.

I speak of this more particularly, because only a short time ago a very vivid illustration of this negligence on the part of the surgeon was brought to my notice. A young man was held up in Oklahoma and robbed; his jaw commenced to swell very rapidly, and he came to our city and was placed in charge of a surgeon, who diagnosed that the jaw was broken. There was considerable swelling; an incision of about an inch and a quarter was made at the ramus where the break was supposed to be, and the surgeon treated that every other day for five weeks, when I saw the case. Upon close examination I found that there was no fracture. The young man was very much surprised at my diagnosis, but on being questioned he gave the following history: Before he was knocked down and robbed, he had a sore jaw, which did not give him much trouble, but after this experience his jaw commenced to swell rapidly, and he came to our city. The patient would not believe that the jaw was not

broken, so I sent him to two of my *confrères* to obtain their judgment in regard to this case, and their opinion was that the jaw was not broken. I found upon further examination that an unerupted third molar caused the trouble. After some consultation with the patient's relatives the tooth was extracted, immediate healing ensuing, and in a short time the discharge ceased—there had been a discharge from the outside, kept up probably by curetting the bone—and the jaw is now perfectly well.

To obviate this practice, so common among physicians and surgeons, we need not criticize them so severely, but whenever the opportunity offers suggest to them in a friendly way that whenever a pathological condition of one or both of the jaws is presented to them they should at least consult an intelligent dentist. The case cited is only one of a score or more that I have seen, resulting in a bad scar on the face and in a great deal of unnecessary pain.

Dr. T. P. HINMAN, Atlanta, Ga. The paper presented tonight has interested me intensely for various reasons, one being that it has been my pleasure and privilege to be a student of Dr. Brophy's. I can therefore substantiate what he has said tonight in regard to the use of bismuth subnitrate, which I have used in my own practice. But before going into that, I wish to say a few words in regard to the removal of the maxilla intra-orally. If anyone has seen the operation done extra-orally, and observed the large scars which such an operation leaves, he can appreciate what it means to the patient to have the portion of the maxilla or mandible removed intra-orally. The four or five cases of this kind which have come under my observation have been mostly extra-oral operations. In the first case of this kind that I operated upon I was unfortunate enough to remove half of the mandible extra-orally, and while the operation was a success, and the man is today in good health, still large scars were left as the result of the operation. I feel a certain amount of remorse every time I see that patient for not having made the oper-

ation intra-orally. At that time, however, these methods were not at our command. In several of these cases I had only to make an artificial appliance in place of the portion of the maxilla that had been removed intra-orally.

The appliance which Dr. Brophy showed for keeping the mandible in line fills a long-felt want. I have had great trouble in making appliances for such cases, and two patients, in whom infection had taken place at the age of about six years following the extraction of the second premolar by a physician, and in both of whom the mandible on one side had subsequently been removed intra-orally, presented to me for an appliance which would bring the mandible toward the median line. An attempt was made by covering the upper teeth with a vulcanite plate on which an inclined plane was placed against which the lower teeth could strike, and in this way the jaw was brought back to the median line to a moderate degree. In another case upon which I operated, the distortion was not so great and treatment of the same kind was not so difficult. I readily appreciate the admirable instrument designed by the essayist, which will greatly add to the cosmetic effect in cases of removal of portions of the mandible.

Paraffin injections, especially in the posterior pharynx, as applied in one case mentioned, have been used to a great extent by practitioners of dermatology, but the essayist did not speak of the fact that in certain cases subsequent serious trouble has arisen from embolism, the paraffin being carried into the bloodvessels and producing an embolus. This method does not seem to have stood the test, and is not now being used to so great an extent as it was at one time. These complications may have been due to an excess of paraffin injected, and if that is the case I should like to know it, as in certain cases we can get admirable results with this material.

I have used bismuth subnitrate to a considerable extent, and am familiar with the article by Dr. Beck which appeared in the *Dental Review*, but the results that I have obtained in the treatment of

pyorrhea alveolaris have not fulfilled my hopes. My trouble is, that when the pockets are injected with the bismuth subnitrate paste, it will not stay in the pockets. If it can be kept in the pockets I believe we can obtain good results, but I have been unable to keep the solution in the pockets, although I have tried very faithfully in several chronic cases. In the treatment of fistulæ, however, I have had practically uniformly good results with this paste. The paste is placed in a platinum-pointed syringe, and after the fistula has been washed out with a boric acid solution, the point of the syringe is inserted into the canal, and after a piece of soft rubber or cotton has been packed tightly around it, pressure is brought to bear on the syringe, and the bismuth subnitrate is forced into the fistula. When the paste comes out, the excess is wiped off, a finger is placed over the fistula, and under pressure on the syringe the paste is forced to all the ramifications of the abscess. I have had, as I said, practically uniform results in these cases, in some of which the necrosis was fairly extensive. In cases where there was considerable destruction, two treatments were necessary, and in one case, where both the lateral and central teeth were abscessed, it required three injections of the bismuth subnitrate to effect a cure, undoubtedly because the paste did not completely fill the necrotic area.

In cases of chronic antral trouble, this paste seems to be the panacea for which we have so long searched. I wish to ask Dr. Brophy what would be the possibility of filling the antrum with bismuth subnitrate in chronic antral cases where the patient wears a metal plug. I have two cases in which the patients would not consent to a radical operation, and I thought of filling the antrum with the subnitrate solution, with the hope of effecting a cure in that way. The antrum in these cases may contain polypi, as there is a continual slight muco-purulent discharge. It is my practice now to take X-ray photographs of injected cases to ascertain the ramifications of the paste in the fistulæ, and in a few cases which

have been treated for a considerable length of time I expect to again take radiographs to see what results I have obtained by the subnitrate injection. This solution has appealed to me particularly in the treatment of fistulæ in the mouths of children. Frequently children present a fistula on one of the deciduous teeth, and my practice is to thoroughly cleanse the fistula, also the pulp-chamber, place a quantity of the paste in the pulp-chamber and force it—by pressing on a small piece of unvulcanized rubber large enough to fill the pulp-chamber—through the tooth and fistula, and then make my filling in the cavity, leaving the solution in the root-canals. This treatment has so far proved to be very satisfactory, the fistulæ healing up and the teeth remaining comfortable.

The appliance which the essayist has shown for the adjustment of fractures of the mandible is a very admirable one. My experience with gold splints in such cases has not been very satisfactory, especially when a portion of the mandible is movable. The best results I have obtained by drilling through the mandible and wiring the broken ends together with a No. 20 gage silver wire.

I wish to thank Dr. Brophy for his very admirable paper. It makes us appreciate more and more our duty toward our patients in regard to oral surgery.

Dr. A. G. FRIEDRICHS, New Orleans, La. I have had some experience in regard to the treatment of fractures, and can appreciate that when the teeth are present Dr. Brophy's appliance is admirable, but I should like to ask him how he would manage a case if there are no teeth present behind the fracture. I have had no difficulty in forcing the fragments into position and keeping them there by means of the teeth locking in the splint, which is made similarly to the one presented, only making it in one piece; I then force the jaw into position, allowing the teeth to lock and hold the jaw in correct position. But how would Dr. Brophy treat an edentulous case of fracture at the angle of the jaw?

Dr. M. C. SMITH, Lynn, Mass. I

should like to ask Dr. Brophy if he would use the bismuth subnitrate solution if a pocket or a sinus is affected by actinomycosis?

Dr. H. C. FERRIS, Brooklyn, N. Y. In reference to the splint used and recommended by the essayist in this case, the size of the material and the forces that work behind the apparatus, it would seem that the movement of the teeth in the alveolus would counterbalance the force active from the other side of the arch. In orthodontia practice, in reducing a case coming under a division of class III of Angle's classification, we utilize the reactive action by such movement of the teeth with the use of intermaxillary elastics, thereby supporting the lateral action and these teeth, and the contraction of the masseter muscles on the affected side, by this cross action of the elastic from one side of the face to the other. I should imagine that in the case under discussion the teeth on one side of the jaw or the other would move buccally.

The bismuth subnitrate paste recommended has been used in my hands in a number of cases, and like Dr. Hinman I have found a great deal of difficulty in getting the mixture into the pockets. There has also been some irritation in the lower pockets, from some unknown cause.

I should like to ask if this bismuth paste is introduced in cases where the tissues are broken down around the apex of the tooth. We sometimes have a sharp piece of bone, or the tooth has become affected at the apex, leaving the latter very sharp; will bismuth paste overcome that trouble, or is it necessary to excise the end of the root?

Dr. HINMAN. My experience in this work is so recent that I cannot answer that question except by saying that in the only case where the X ray has shown such a condition the bismuth paste has been used, and a cure has been effected. The radiographs of these cases show the end of the tooth completely encapsulated by the paste.

As bismuth subnitrate, paraffin, and wax are all insoluble, the only soluble

portion of the paste being vaselin, I should like to ask whether there is any virtue in the paraffin or wax, and whether bismuth and vaselin alone would produce the same results?

Dr. BROPHY (closing the discussion). The use of the Roentgen ray seems to be the chief feature of this discussion. Dr. Beck's object in using the bismuth paste, as stated in the paper, was to place some opaque material in the tissues, so that he might by the use of the X ray discover the course of a fistula, and he found that following these injections sup-puration ceased. I cannot say too much in favor of the X ray. It would seem to me impossible, after our experience with it, to get on without it. It clears up many obscure conditions, and enables us to make a diagnosis in a case about which, prior to its use, we were in doubt. With it we have the way cleared regarding the actual condition of a part, especially if we have diseased bone, necrosis, malposed teeth that may be centers of neuralgia, spiculæ of bone, excementosis, foreign substances in the tissues, etc.; I cannot name all the conditions that render it necessary to employ this agent as a means of diagnosis.

In the use of paraffin in the restoration of the symmetry of the jaws and face, I have not had any of the bad effects mentioned by Dr. Hinman. If such trouble appears, it may be accounted for by the solution having been too thin. A solution used in a tooth might pass into the circulation, but if the paraffin is used in the form of a paste I think you need have no fear of its causing a thrombus or of disturbing the circulation.

I do not blame the young men of the medical profession for making errors in regard to an operation which they have never had an opportunity to learn. But I do find fault with the schools of medicine which do not give the student the chance to study pathology in all its phases. We know that a very large majority of the medical schools in this and other countries have no men to teach the morbid anatomy of the teeth and all the pathological conditions caused by diseased teeth, and we see the sequelæ of

this lack of training. We could not reasonably expect anything else. If the medical school did not teach the treatment of cutaneous diseases, should we wonder that the young physician made errors in attempting to treat them? If they did not teach ophthalmology, should we wonder if the physician passing out into practice made errors in attempting an operation of the eye or in treating the ordinary everyday lesions of that organ? Certainly not. I am not finding fault with the medical men for making errors, but in my opinion they should not attempt operations which they do not understand. At the meeting of the American Medical Association held in 1907 at Atlantic City, a report was made by the Committee on Schools in which the statement was made that fifty per cent. of all medical colleges in the United States are so poorly equipped and are so imperfectly organized and have such meager facilities, that it would be better for the profession if they were discontinued. I do not know whether that report was absolutely correct or not; but we cannot expect so poorly educated physicians to be well-qualified practitioners. We make errors, and yet we study hard with the view to preventing them; the most successful man is the one who makes the fewest errors. I have seen the entire symphysis of the lower jaw removed from molar to molar by a surgeon who thought that the patient had carcinoma, and there was nothing wrong with him except that a dento-alveolar abscess discharged lingually and lifted up the tissues forming the floor of the mouth. The patient was a vigorous young man, a student in one of our great universities. He came to me to see if I could adjust some artificial appliance to compensate for the loss of bone. As Dr. Patterson says, these errors are being made all the time by men of great repute, not by men of meager capacity—because of the lack of knowledge of that important subject, dental pathology, which medical students do not learn.

I might state in passing, that in cases where it is expedient, and where the patient must lose a great portion of the

bone—necrosis of the mandible following eruptive fevers, such as scarlet fever or measles, etc.—I have frequently kept the sequestrum in place while removing the bulk of the bone until the periosteum would throw out new bone, thus preserving the contour of the face. I had two patients that were damaged in this way. Instead of removing the sequestrum when it seemed proper, after the line of demarkation formed, the necrotic bone was kept there until the periosteum formed a shell of bone surrounding it; then, by taking the bone out piecemeal, the normal balance and contour of the face was preserved.

In the case of a patient for whom I removed half of the lower jaw last year, I did not make use of the appliance exhibited, but wired the teeth together and in that way succeeded in obtaining a perfectly normal occlusion. The principal thing to do after the loss of a portion of the mandible is to hold the teeth in position until cicatrization takes place, and when that is complete, all the tissues will set and harden and the normal occlusion will be preserved. This appliance, which I will pass around later, will hold the jaw, until cicatrization is complete, and the patient can continue to chew on one side. I wish to state that in some cases the necrosis is aggravated by the injudicious use of oxygenated waters, such as hydrogen dioxid. In these waters the gas is liberated and must come out somewhere, in the same way as a cannon will burst if the powder charge cannot get out of the muzzle of the gun. If you put these waters in contact with pus or blood the infectious material will be forced beyond the territory to which it would otherwise be confined, producing necrosis of the bone.

I hardly agree with Dr. Hinman that paraffin is not being used as much as it was formerly. Many people are greatly benefited by its use in the restoration of disfigured features.

To make the bismuth paste stay in the pockets, just a little more wax or a little more paraffin is added to make it harder.

I do not think much of metal tubes worn in the antrum. I formerly used

them, but have abandoned them. I cannot understand how any man can tell what is in the antrum without making a big opening and looking into it. We may as well try to see what is in a barrel by looking in the bung-hole—it is all dark in there, and we cannot see anything. But if a sufficiently large opening is made in the canine fossa we can easily see what is in the antrum, and I venture the assertion that in chronic empyema the antrum is nearly if not quite full of polypi. I tell every student, when we open an antrum that has been diseased for six or eight months, that we shall find polypi, and I have never failed yet. I operated upon two such cases last week, and in both the antrum was filled with polypi. An opening was made large enough to disclose the inner walls of the antrum, through which I could curet the polypi. Next week these antra will be filled with the bismuth paste. If a tube is put in the antrum for drainage, it will drain, but of what use is draining? The tube will simply drain the pus that is forming around the polypi as long as the polypi remain. But we wish to get at the bottom of the trouble, remove the cause of the disturbance, and effect a cure.

Dr. Friedrichs remarked that he had encountered trouble in splinting the fractured ends in fractures occurring back of the teeth. I wish therefore to say that this appliance is not applicable in all cases, but only when the teeth are present. When a fracture occurs back of the teeth or at the angle of the jaw, other means have to be employed, the wiring together of the ends of the bones being the simplest and most reliable method. Sometimes we can adjust the interdental splint in these cases, but we have to use judgment, and call upon our ingenuity to work out something that will meet the conditions presented.

The moisture, which is troublesome in putting the splint in place and fastening it, is very easily overcome by adjusting the rubber dam.

Dr. Smith asked about bismuth paste in the treatment of actinomycosis. Upon returning I shall try it in a case that

has just presented. About two years ago I presented a paper on the subject of actinomycosis before the National meeting held at Minneapolis, which you will find published in the Transactions. I there described a method of treating this disease which I have used successfully in a number of cases. Actinomycosis is curable if the patient is treated with potassium iodid and sulfate of copper before any bone has been destroyed. In one case that I now have under treatment I shall try the bismuth paste and report my results.

Dr. Ferris spoke of the application of force on the splint. I know of no better splint that exerts equal force on both sides. It conforms very well to all the irregularities of the lower teeth, so that when the patient closes the mouth it exerts equal force on both sides. It is often necessary, however, after adjusting this splint and allowing the patient to try the occlusion, to now and then touch off a little spot with the stone where the occlusion seems to strike a little harder than anywhere else, and in this way we enable the patient to go on using the jaw. This splint offers the advantage that as soon as we adjust it we enable the patient to use the jaws, which is much better than fixing the jaws by some appliance which must be sometimes accomplished by wiring the teeth and holding them still. This appliance offers an ideal way of securing proper occlusion, and the chief object in treating fractures after union has taken place must always be to secure proper occlusion. If we succeed in securing normal occlusion after a fracture, we have attained the highest degree of success in treatment.

In conclusion, I wish to say that I feel indeed grateful to my audience and to the gentlemen who participated in the discussion for the very courteous appreciation of my hurriedly composed paper.

The next order of business was the reading of a paper by Dr. A. H. THOMPSON, Topeka, Kansas, entitled "The Evolution of Tools."

[This paper is printed in full at page 1402 of the present issue of the Cosmos.]

Discussion.

Dr. L. G. NOEL, Nashville, Tenn. This paper, and especially the essayist's reference to the ingenuity of apes, has interested me very much. Naturalists have said that man is the only animal capable of reasoning. Yet when we study Darwin and Thompson, we come to the conclusion that the lower animals have a somewhat similar power of reasoning. Darwin, for instance, tells us of an ape that soon learned to take a stone and crack cocoanuts in order to get the milk from them, and would then hide the stone, which showed the idea of property. He also tells of another ape that had the ingenuity to take a stick to pry the lid off a box, to get something out of it. He also relates instances of elephants that used the foliage of the trees to fan the flies away with their trunks, and mentions a great many other instances of ingenuity in the lower animals.

We all have no doubt seen many of these curiously shaped stones picked up in Alabama, Tennessee, or Kentucky, and I have myself picked up flints of considerable length, carved in the shape of arrow-heads, that may have been used as implements. Prescott tells us of stones with exceedingly sharp edges which the priests used for sacrificing their victims. With a piece of this stone, which they called *itzli* and which we know as obsidian, they would cut out the heart of an animal and offer it to their gods. Dental writers also report the finding of wonderful inlays in Yucatan, and in one of the Boston museums, I am informed, there are preserved inlays of some mineral that are more ingeniously done than we could make them today with the tools at our command. There we have evidence of lost arts. Dr. Guerini, in his interesting history of dentistry, which I hope will appear soon, tells us of the Etruscan, the Grecian, and the Egyptian dentistry, taking us back four, five, and six hundred years before Christ, when successful workers in gold made bridges and introduced crowns, and in many instances soldered gold substances together in such a way that the loosened teeth

were held fast in the mouth. That is another evidence of lost art, and yet, when someone in the nineteenth century found a method of making crowns, he immediately rushed to the patent office, and formed a Tooth Crown Company, although such dentistry is nothing new!

Some of the older gentlemen present have probably heard Wendell Phillips' lecture on the lost arts and tell of his researches in ancient languages, which furnished strong evidences that many implements and tools employed at present are old and were well known to past and forgotten civilizations. He was sure that the ancients knew the art of making glass, and that they had constructed microscopes and other optical instruments. In many arts and sciences the Egyptians excelled our workmen of the present day, and we know that in the city of Damascus, hundreds of years before the Christian era, they were familiar with a way of tempering steel that was very effective, and that has become one of the lost arts.

We also know that the paints of the old masters have stood the test of time better than any manufactured today. The works of the old Venetian masters, when cleaned up, exhibit very bright and beautiful colors today, but our modern painters produce works that fade after a short time.

From these lectures of Phillips we gather that we have probably lost many achievements of dentistry, and Dr. Thompson tells us that the ancients could cast before they had learned to make tools by forging, which indicates that we are going backward, for we are just now beginning to make castings.

Dr. G. V. I. BROWN, Milwaukee, Wis. The reading of Dr. Thompson's paper suggested to me quite a number of important thoughts that might be valuable in the discussion of the subject, but are not sufficiently interesting to keep you longer at this late hour.

I desire to say, however, before passing the subject, that I personally feel, as I am sure you all do, a sense of indebtedness and gratitude to Dr. Thompson for the very great work which he has done. His unselfish effort of so many years has

helped to secure the dental profession a place among the other scientific branches. He has done much to preserve the bond of union between dentistry and the other sciences, thus securing for us due recognition. His work in anthropology and allied subjects has been unselfish, as it has not brought him personal benefits or aggrandizements as some other more lucrative and better appreciated research would, and we all owe him a great debt of gratitude for his efforts.

Dr. F. O. HETRICK, Ottawa, Kans. I feel that after Dr. Thompson has been dead for a hundred years or so, the dental profession will appreciate his work more than they do now, when everyone is much more interested in getting rich than in the foundation of our present modern ideas.

The use of tools in our work, as mentioned by the essayist, reminds me of an anecdote of Dr. Atkinson. Dr. Atkinson was giving a clinic before one of our meetings, and on his operating table lay an elaborate set of very beautiful instruments. One gentleman, in looking over these instruments said, "Anybody could do such work with those instruments." Dr. Atkinson immediately announced that he would give another clinic the next day. He then prepared a cavity for a gold filling with a single excavator, and when he had finished the preparation of the cavity, he broke off the point of the excavator and filled the tooth with gold, and very few men could insert a better gold filling with modern instruments than he did with that broken instrument. This illustrates that it is not so much the tool as it is the man behind the tool.

Dr. Thompson has done a great deal of valuable work in the study of evolution, comparative anatomy, anthropology, etc., carrying on scientific work for years at his own expense in Arizona and New Mexico.

With all of our modern equipment, we have not yet gotten past using the club, which was the first tool used by man. The dental profession has been progressing in the matter of tools, which fact is making our work easier; but is

our work really better than that which some men did years ago with only three or four tools?

I am afraid that the men who are devoting their efforts to bridge and other work are too intent on gain to give thought to the scholars who laid the foundations of their work. Dr. Brophy, Dr. Brown, Dr. Patterson, and others have taken up some specialty, working out a tool or a method for it, leaving it to the dentistry of the future to reap the results of their labors. Shall we therefore not honor the men who as pioneers blazed the way for us?

Dr. C. C. ALLEN, Kansas City, Mo. Dr. Thompson by his unselfish work has made a name for himself as an anthropologist which will live after him for many generations. There is more in the world than the mere practice of dentistry, and

to me one of the great compensations of the art and science of dentistry is the fact that a man who has his practice properly ordered may keep up well in his specialty and still have time to devote himself to some extraneous subject. To me that is the greatest reward of the profession. There is certainly no great financial remuneration to be gained in dentistry, and while every man may make a living in that calling, if he is ambitious for worldly goods he had better keep out of it. But any man who so desires may devote himself to some of the collateral sciences, and do work that will stand as a monument in his honor and will be a source of pleasure to him in his declining years.

The subject was passed and Section III adjourned until a later session.

(To be continued.)

PENNSYLVANIA STATE DENTAL SOCIETY.

Forty-first Annual Meeting.

(Continued from page 1311.)

TUESDAY—*Evening Session.*

The meeting was called to order Tuesday evening at 8 o'clock by the president, Dr. Bratt.

The first order of business was the reading of a paper by Dr. G. V. BLACK, Chicago, Ill., entitled "A Plea for the Wider Utilization of What is Known in Filling Teeth."

[This paper is printed at page 1390 of the present issue of the COSMOS.]

Discussion.

Dr. J. D. WHITEMAN, Mercer. It is said that he who follows the king has but little to say. I realize the force of this doubly in attempting to discuss a paper written by our king of dentistry, Dr. Black. When Dr. Black speaks it

behooves the rest of us to listen and think, and that is what I should much prefer to do.

A number of years ago Dr. W. C. Barrett, in addressing a local society consisting largely of enthusiastic young dentists, paid them a doubtful compliment by saying that the proceedings of the meeting had impressed him that they were an intensely practical body; but he admonished them not to limit their attention and efforts to the mechanical side of their calling, saying, "Aspire to get above the artizan!" It is plainly the purpose of this paper to assist us in attaining that end.

Dr. Black says: "The complete divorcement of dental practice from studies of the pathology of dental caries which has existed in the past is an anomaly in

science, and should not continue. It has the tendency, plainly apparent, to make dentists mechanics only."

We make broad claims for dentistry, insisting that it be recognized by the public as one of the learned professions. Has the public not a right, then, to expect that we shall so adapt our services as to not only restore the damage done, but prevent a recurrence of a similar condition in the future? Consistency with our pretensions demands it. We might as well recognize first as last that in order to be regarded as a scientific body, we must be scientific.

We owe much to Dr. Black for our ability to accomplish such results. First of all he has taught us that teeth do not decay because they are soft, as we thought, but because of their environment. In other words, he has shown us clearly that unscientific and poor dentistry and not poor teeth has been responsible for our failures in fillings, and indeed in many instances actually for the initial decay of the teeth.

He has taught us that in order to render a filling protective, we must study the area of liability in which it is placed, and in its preparation so lay the margins of the cavity as to include the vulnerable portions of this area.

The whole profession has been so absorbed in the development of methods and materials that pathology has been accorded but very little consideration, and our progress along these lines has thus obviously been retarded.

In fact, the further progress of dentistry, even along mechanical lines, demands that hygienic, etiologic, and pathologic considerations enter into every case, in order that the requirements of each specific condition may be intelligently met.

The recent advances made in our profession along scientific lines indicate the rapid elimination of empiricism in dentistry, and the better utilization of the known pathology will mark a long step in the treatment of dental caries.

Dr. H. E. FRIESELL, Pittsburg. Most of us give a great deal of credit to the investigators who have traced out the cause and the action of that disease which

is at the base of our profession, caries in dentin, but few of the younger men of today, and perhaps fewer of the older men, realize who the man was who has taught us practically all that we know of the action of caries in enamel. Without wishing to detract one iota from the merits of those investigators who have done such excellent work in their researches on the action of caries in dentin. I wish to say that a knowledge of the action of caries in dentin does not compare in importance with the knowledge of the action of caries in enamel. If we can control this disease in the enamel, we will have to worry little about its action in dentin, and to the grand old man whom we have with us at this meeting dentistry owes practically all that is known about the action of caries in the enamel. We also owe him much for helping to establish on a scientific basis many of the other branches that have made of the profession of dentistry what it now is.

To me this is a moment of particular pride, as I feel that I have been to some extent instrumental in bringing to my home city, to my State Society, and before the young men whom I have tried to teach, the man from whom I have learned most that I know in dentistry. In bringing Dr. Black here I believe we are giving the members of this society the opportunity to see and hear the greatest man that our profession has produced, the man whom we as a profession probably do not appreciate as we should, but whom some day we will. I am glad that after a good many efforts we have succeeded in bringing him to our State Society.

As Dr. Whiteman said, there is little left to talk about for those who come after the king, and my only effort shall be to emphasize some of the points brought out in the paper, believing that a little repetition may perhaps be advantageous. No longer is it sufficient that we simply fill holes in teeth, as we have done in the past; we must realize from what Dr. Black has shown tonight, and from what he has done for so many years, that a knowledge of the beginnings

of decay on the surface of the enamel, a knowledge of why decay begins at certain points on various surfaces, and why it is limited in its spread, is one of the very fundamentals of dentistry. We must realize the importance of the knowledge of a clean and an unclean surface of the tooth, in order that we may include in the outlines of our fillings the susceptible area of the affected surfaces of the teeth; and knowing that decay begins always on these unclean surfaces, if we can in each case include the susceptible area in the outlines of our fillings, we shall be able with some certainty to expect to cure these lesions of caries.

Dr. Black made another statement upon which I wish to lay particular stress, namely, the necessity of so restoring teeth in our operations that the patient can use them in *active, forceful mastication*, and any operation on the teeth, no matter how perfectly it may be accomplished mechanically, unless it leaves the teeth in such a condition that the patient can use them in active, forceful mastication cannot be considered a success. If the teeth are used in forceful or normal mastication decay will be much less liable to re-occur in the mouth. An examination of a mouth in which caries is making very rapid progress on one side will usually show an abnormal condition of the soft tissues. An exposure of a pulp, a sensitive cavity, or sensitive peridental membrane, in consequence of which a patient cannot bite freely on a tooth, is most frequently responsible for the patient not chewing on that side, and caries will be found to progress more rapidly on that side. All of our operations, then, should be performed so as to protect the sensitive tissues in such a way that, no matter how strenuously the patient uses the teeth, he can do it with comfort.

The subject of the small contact point is very hard to grasp for many operators. A great many operators in the East believe that the function of the contact point is to protect the gum tissue, and that in proportion as the contact point spreads broadly over the buccal and lingual surfaces and becomes a contact

edge, it affords so much greater protection to the gum tissue. This is a mistake, as Dr. Black has pointed out. The smaller the contact point, the actual contact, the better it is for the approximal surfaces of the tooth. The sole function of the contact point is to break up the bolus of food as it is forced down into the interproximal space by the occluding cusp, and to divert the mass of food out through the lingual and buccal embrasures. The smallest actual contact point is sufficient to do this, and to prevent food from impinging on the gum. The food forced out through the embrasures keeps clean those portions of the tooth that are not covered by the gingival tissue. Aside from the foregoing, the contact point has the function of maintaining the proper mesio-distal breadth of the teeth and the proper size of the interproximal space, and an approximal contact that is similar to that of two spheres, or two marbles, will accomplish all this as well and better than one that is three millimeters in width.

Dr. THOMAS WEEKS, Philadelphia. It seems to me that the reception of this paper disproves the statement sometimes made that the East does not believe the same as the West. It occurred to me as I sat listening to the paper that there was once an eastern man, who is now dead, who put forward some original ideas with regard to dentistry, and received nothing but ridicule in the East, being accorded a better reception in the West than in his own section. Dr. Bonwill claimed that pyorrhea was an unnecessary condition; that all diseases of the teeth were unnecessary if the teeth were put in condition to perform their normal function. Dr. Black has said the same tonight. Gentlemen, you have to believe in Dr. Black and what he stands for, and every successful operator and college is following Dr. Black's teaching, and, like Dr. Friesell, I wish to say that much of whatever success I have had as a teacher and as a practitioner is due to the inspiration which I have received from that "grand old man."

Dr. W. G. EBERSOLE, Cleveland, Ohio. I have been very much interested in fol-

lowing the work of Dr. Black, and was much impressed by his theories of extension for prevention. Unfortunately for Dr. Black's theories, many of the men who attempted to demonstrate them were not at all following his teachings. They went to extremes, and I was very glad to hear Dr. Clack speak of Dr. Searl's idea of the destruction of the teeth. I have possibly criticized more severely than any other man the members of the Black Club for the way in which they destroyed healthy tooth substance. My criticism, however, was based not upon the theories which Dr. Black has been trying to impress upon you, but upon the wrong interpretation and demonstration of his ideas by the men who were attempting to teach them. I most humbly apologize to Dr. Black for any unjust criticism that I may have made from a wrong standpoint. Many men wrongly interpret Dr. Black's teachings. I do not by any means agree with all of his theories, or those of his followers. I believe that Dr. Black stands nearer perfection from the dental standpoint than any other man living today, but that does not mean that all his teachings are ideally perfect. Dr. Black has high ideals, but he may be making mistakes; he is making mistakes, how many it is not for me to say.

Dr. Black attempted to show us on the screen that liquids will not penetrate the solid substance of the enamel, and for fear that I have misinterpreted him and that he may leave an erroneous impression, I would like to ask him whether he means by his statement that water will not pass through the enamel into the dentin?

DR. BLACK. I wish to say that I have no experimental results that indicate with any certainty that water will pass through the enamel into the dentin. There is, however, probably some shrinkage of enamel, showing that it may lose water.

DR. EBERSOLE. I asked that question with this object in view: Some two or three years ago I made the statement before one of our societies that moisture will penetrate the enamel, which I know to be correct. As a basis for my argu-

ment, I wish to say that with the use of a high-pressure syringe I can demonstrate, as I have done many times to my own satisfaction and to that of others, that in making the initial pit it is absolutely unnecessary to penetrate into the enamel farther than to get a slight contact, when with the syringe liquid can be forced through between the enamel rods. Even by ligating a piece of heavy rubber around a tooth so that the liquid cannot escape, then forcing a cocain solution with a syringe into the rubber around the tooth, making it balloon out about the tooth, and leaving it for quite a time, I can force into the tooth a sufficient amount of cocain solution to obtund the pulp. From my experience, I therefore believe that moisture penetrates between the enamel rods sufficiently to reach the dentin and thence the pulp.

DR. R. E. DENNEY, Philadelphia. There are cases in which the beginning of decalcification is evident, the tooth turning white and the intercellular substance disappearing before the breaking down of the enamel rods has taken place, such as we frequently find on labial and buccal surfaces. I should like to ask the essayist whether he has in his experimental work found anything that might be used to replace that intercellular cement substance and prevent the breaking down of the enamel rods? I ask this because I have noticed that in the mouths of tobacco-users, where there has apparently been a beginning of decalcification and no breaking down of the enamel rods, the stains from the tobacco had apparently penetrated the decalcifying dentin, though the enamel rods have not broken down. I have been wondering whether any method has ever occurred to Dr. Black by which we could prevent the enamel rods from breaking down.

DR. W. R. CLACK, Clear Lake, Iowa. One member asked the question if there was anybody who did not believe in extension for prevention. Gentlemen, history repeats itself. It was not so many hundred miles from Pittsburg that the story of Rip van Winkle originated. There are Rip van Winkles today, and the East has no monopoly on them. We

have at least one west of Iowa. I possess a copy of the proceedings of a state dental society adjoining Iowa, in which a teacher of dentistry, as he affirms in the discussion, shows that he has been asleep so many years that he still does not believe in extension for prevention nor in squared angles in dentin; he also says, "This under-the-gum business is all nonsense," and that decay will take place under healthy gum tissue. I believe if that gentleman could have seen some of the illustrations thrown on the screen tonight he might have changed his opinion.

Dr. Black's very first remarks proved the necessity for orthodontia work, the placing of the teeth in position that the patient may keep them clean. Have you seen many cases of pyorrhea, Dr. Black, that may not be traced to some irregularity of the teeth, some inability of the patient to keep certain areas clean?

Dr. BLACK. Very few.

Dr. CLACK. Many practitioners say that they make contact points between the teeth of their patients, and that they do not keep the food from passing down and pressing on the gum tissue. The majority of failures in such cases are due to failure to observe conditions. I have seen many fillings in which contact points were made, but not in the right place. In this case [illustrating] notice where the contact point should be. If it were placed here [illustrating] or there, it would leave the embrasure in such a condition that the food would not lodge there. It must be so small as to be only a dividing point, and let the food into these embrasures. If the contact points are properly placed, there will be no trouble whatever in having the food pass through the embrasures and cleanse them.

Regarding separation of teeth, so many dentists say that they cannot secure it. If you will, however, say to the patient, I must and will have separation, or I will not make the filling, it will not be very long before he comes to terms. If he does not, and goes to someone else who uses the same argument, he must finally yield. If the dentist, of course, does not wish to lose a patient, and goes

ahead and makes a faulty filling, it is largely his own fault. Dr. Black mentioned another case in which a filling failed (and I strongly suspect that these casts were made from the doctor's own teeth), a large mass of cement having been placed in the cavity and the filling having been inserted immediately. It takes something like sixty hours for the final crystallization and shrinkage of cement. In making inlays a great many operators are in the habit of putting gutta-percha in the tooth in order to save a little gold; they take the impression over the gutta-percha, make the inlay, remove the gutta-percha and set the inlay, filling the whole space with cement. When that entire mass of cement shrinks, as the majority of cements do, sooner or later—a large number of inlays fail for that very reason.

The loss of the mesio-distal diameter of the tooth from abrasion of the contact points is a very interesting subject. It was my good fortune a few years ago to get possession of nearly a peck of teeth of all kinds that had been extracted by a physician who "extracted without pain." In studying these teeth I found that many showed by their appearance, by the abrasion which had taken place on the occlusal surfaces, by discoloration, etc., that they had been extracted from persons of middle age, or past, who should have been immune to caries. A great many of these patients no doubt were immune, but in most cases I found large facets where the contact points were entirely obliterated, and fillings in which contact surfaces instead of contact points had been made and where food had impacted, and in every one of these cases caries or evidence of caries in the concavity of these teeth was noted. In one of these cases, especially, was shown a mesio-occlusal angle where at some previous time slight decay had taken place and immunity had set up in the meantime—you know that polished appearance of decayed enamel that has become immune; but food had become impacted and decay was taking place in the concavity. It is the duty of every dentist to examine the teeth of his patients from

thirty-five years upward and see that these contact points are kept tight. I believe it is not only the privilege but the duty of the dentist to cut cavities in the approximal surfaces of the teeth, and make such restorations and contact points as will protect the gum tissue in the interproximal spaces.

Dr. F. D. GARDINER, Philadelphia. I would not undertake to discuss a paper like Dr. Black's, which seems beyond discussion, and from which we can learn some most important lessons. I believe the most important lesson taught by it is that caries of the teeth is a disease and should be treated as such. Few will question the statement that generally caries is treated mechanically, and without regard to its being a disease.

Dr. P. B. McCULLOUGH, Philadelphia. Had I been called upon half an hour ago, I might have talked for half an hour. I rise now only to pay my respects to the essayist, to say that for his work in histology, bacteriology, the physical properties of teeth, etc., I have the highest regard. I might even apologize for assuming the right to pay this tribute. But I feel that such of this research as has been used as material upon which to base standard cavity shaping characterized as "extension for prevention" is not the complete logical application of these fundamental truths.

I recently read a paper treating of cavity preparation before the Susquehanna Dental Association, and I will therefore not repeat here what I have written.

I recently observed a case with many gold fillings and inlays beautifully typifying the angular principle of cavity preparation; it was science reduced to machine precision—it savored too much of measuring natural phenomena with the "yard-stick." The work was done without any evidence of any regard for the vitality of the pulp within. The patient was uncomfortable, and I dared to suspect that he was suffering from too much dental interference.

Causes responsible for decay do not begin with the acid secretions upon the enamel surfaces, but they begin with the general nutritional state, so that periods

of susceptibility are not dependent upon the development of the acid as a primary factor, but are due to changes in the nutritional equilibrium affecting the saliva so as to make it a medium favorable for the development of the acid-secreting bacteria. The question of the cause of decay is not understood beyond the point that acid-secreting bacteria cause it, and we have no right to say that in an angular type of cavity preparation we have a scientific cure for a disease the cause of which we do not completely understand.

Dr. CLACK. How do you account for this fact: A patient, who is extremely susceptible to dental caries had about twenty-two operations in gold made by the Black methods, and in a period covering eight years no recurrence of decay has ever taken place in or around any one of these fillings; but other cavities of initial decay have appeared in other teeth, showing that the patient was not immune, but extremely susceptible to decay? Now, what caused the condition of immunity in those particular teeth that had been filled on the principle of extension? What caused the immunity in these teeth, if not the fillings? Why did no recurrence of decay take place in these teeth, as initial decay did in other parts of the mouth?

Dr. McCULLOUGH. How old is the patient?

Dr. CLACK. The patient is now twenty-five, and there is active initial decay taking place in other teeth.

Dr. McCULLOUGH. It is very hard to pass upon a case all the detail of which we do not know. It is likely that in a normal healthy state this patient is just approaching the period of immunity, as is the case in the average patient. The new surfaces attacked are more susceptible to decay than the margins bordering the fillings; this, however, does not prove that these margins will not fail if this state of susceptibility continues, as eight years is not a sufficient test for a gold filling.

Dr. CLACK. We do not recognize the years from eighteen to twenty-five as the period of immunity. We consider twen-

ty-five as the beginning of the period of immunity.

Dr. McCULLOUGH. Theory will permit to generalize, but in practice it is an individual equation. I have filled the teeth of children of twelve years of age with gold, when I recognized the fact that the patient had reached the period of immunity, but on the other hand I have refused to fill the teeth of much older patients with gold during periods of susceptibility to caries.

Dr. BLACK (closing the discussion). I suppose I should answer regarding the apparent hardening of decayed areas of enamel and the cessation of decay in enamel. One of the speakers asked if the enamel would become harder. I say, Yes. It seems to become filled very solidly with what I think, but have not absolutely proved, to be sulfurets. If you will perfectly cover with wax the roots of teeth that have light spots of beginning decay, leaving the crowns exposed, put them into a little water, stir into this water some egg albumin, and let it stand until putrefaction has occurred and passed, you will find that practically all of these decayed areas have become black and apparently harder than they were before the teeth were put in the water. They are like those that we find in the boxes of teeth that we examine. We will find hundreds of them in the mouth where decay has stopped.

Now, I will tell you an experience of my own. Quite a little while ago, a filling that I had worn for many years in one of my own teeth became so flattened at the contact that it was giving me trouble. I asked my son to cut a little slot in the gold filling and place in a piece of iridio-platinum wire so as to hold the teeth a little apart, and plug it in with some gold. I wished this easier type of operation. He said, "The other tooth is very dark." I asked him to try it with an instrument and see if it was hard, and his answer was that it was fairly hard; so I told him to go ahead. The case went on nicely, there was no more trouble, no more pressure on the gum tissue, and I was relieved. After six months I suddenly experienced renewed trouble. I

asked my son to look at the tooth again, and he said that the wire had broken into that old decay in the proximating tooth. He found quite an opening inside. The decayed dentin had become dried and had shrunken away from the enamel. That is what occurs: In these cases the organisms have been brushed away and putrefaction occurring in the mouth causes these sulfurets to immediately begin to sink into, and fill in between the enamel rods, and the enamel is harder than before. Then if we venture into the dentin, we will find no organisms there. They have never passed through the enamel.

I have been very glad to have this discussion. I like to hear men speak according to their convictions. My friend is the earnest man, and the question as to whether he agrees with me is not the question I ask. A good many times Dr. Miller and I did not agree, but that did not interfere with our mutual friendship. The man who is in earnest, whether he agrees with me or not, is the man I believe in; he is the man I wish to associate with, the man with whom I wish to discuss all of these questions. I want it understood definitely that all of the slides of fillings that I have shown here tonight are labeled "evidences of careless operating," and I have brought them here and have shown them as evidence that somebody is doing careless operating. There was no earnestness in the making of any of these fillings, and that is why I detest them, and I wish that every man who is filling teeth were doing his work earnestly, using his brain and his hand for all that is known as the best in dentistry. It is not a question as to whether this man agrees with me. Is he doing his best? that is the question; and so long as we work in this way, doing the best we can, we will have little trouble. Over and over again I am asked to prepare cavities in models of teeth. Gentlemen, I cannot do that; I must have the surrounding conditions to study. True, I can make a typical box form of cavity, but that may not meet any particular case, and the only reason why I have been so long in presenting this pa-

per is that it seems to me that I cannot present one phase without the other, as the whole thing is bound together. It takes a whole volume to tell this, and even then we will tell it imperfectly. I am sorry that I was so long in reading the paper. Some of the pictures are new and some are old, but each illustrated a point, and maybe I left out some of the most interesting ones. Sometimes I think I had better quit reading papers before societies. I do not believe I do it very well. Sometimes I think I can do better when I can get up and talk, but I do not always do that very well either. Sometimes I am very much discouraged because I am not understood, yet in the long run I find

that I am understood better year after year, and I suppose I will have to keep hammering at it as long as I live. I am not always right; I do not want anyone to take it that I am always right. It is true, for the most part, that I have been able to correct my errors before others have corrected them for me, but I find myself wrong many times and I no doubt may be wrong yet many times, but in the aggregate I hope I am doing some good.

Motion was made and carried that a rising vote of thanks be given the essayist for his very interesting and instructive paper.

Motion was then made and carried to adjourn until the morning session.

(To be continued.)

FIRST DISTRICT DENTAL SOCIETY OF THE STATE OF NEW YORK.

Monthly Meeting, March 1909.

A REGULAR meeting of the First District Dental Society of the State of New York was held on Tuesday evening, March 9, 1909, at the Academy of Medicine, 17 West 43d st., New York city.

The president, Dr. J. W. Taylor, occupied the chair, and called the meeting to order.

The Secretary stated that inasmuch as the paper of the evening was a lengthy one, he would like the privilege of allowing the reading of the minutes of the February meeting to go over until the April meeting.

Dr. WALKER moved that all preliminary business be dispensed with, except the proposals for membership. The motion was carried.

Prof. GEO. A. BATES of Tufts College, Boston, then read the address of the evening, which was illustrated by lantern slides, and was entitled

SOME STUDIES OF LIFE AS IT FINDS EXPRESSION IN LIVING MATTER.

First of all, I want to thank you for the kindly reception you have accorded me, and for the delightful hospitality I have experienced since coming to New York.

When I was asked to come here, I cast about to determine what should be my subject. Knowing I was to address a dental society I was very naturally led to think first of a dental subject, and then I thought that perhaps dentists would not be averse to some subject outside their own professional lines; so I allowed my own predilections to govern my choice, and have brought you a study in pure science. The subject is one that is just now engaging the attention of the most advanced biologists, and is perhaps the most important question with which

that great branch of science has to deal. It is a study of life.

For many years the physiologists have contended that physics and chemistry are entirely adequate to account for all the phenomena that find expression through the living organism, including the so-called "life principle."

The term life principle was formerly used by the old school of vitalists to designate some hidden mysterious entity, supposed to be resident within the organism, that dominated all its action and accounted for all its vast complex of functional activities, together with its power of growth and reproduction. To it were attributed a multitude of potential properties, and it was made a sufficient answer to all the ultimate problems that are so continually baffling the efforts of science.

This state of affairs led at last to the attitude of modern physiology in relation to this vital question, viz, to hold in abeyance all final judgment appertaining to the problem of life until further developments shall decide. The position assumed by the physiologist at once precipitated a controversy between the vitalist and the exponent of physiology.

The argument has of late been shifting ground, and under the influence of new light which has come out of recent investigations in the field of biology, a new aspect of the question at issue has been presented, and a new school of neovitalism has arisen.

The fundamental problem of biology is the question, What is life? Out of the study of the various phases of phenomenal activity observed in living matter during the processes of reproduction and developmental modification incident to metabolism and growth, the problem has come to be stated in the following question: Is there a law or principle or set of principles that cannot be accounted for by chemistry and physics, within living matter, which controls its activities and, in some measure at least, determines its nature, structure, and response to external stimuli? The new school is now addressing itself to this new phase of the life problem. It is in the hands of

the leading biologists of the world, among which may be prominently mentioned Professor Hans Dreisch of Heidelberg, who has recently published a book on the subject, in which he has not hesitated to take the problem over into the realm of philosophy, based upon the researches and conclusions of the biological investigation. It is to a study of some of these recent investigations and conclusions that I invite your attention tonight.

Any study of life must begin with protoplasm, since it is only through this substance that life finds expression.

Protoplasm is the most complex substance known to science. It is not a chemical but a morphological substance; it cannot be analyzed because of its unstable character. The chemical elements that enter into its composition are known, as these may be recovered after its disintegration. It is known that these simple chemical elements do not enter into its composition in the form characteristic of ordinary chemical compounds, but in groups, in the form of definite compounds, so that the formula of protoplasm is represented by an assemblage of chemical substances held together by a common bond. This bond is exceedingly weak and fugitive, and the formula is thus easily broken apart when the protoplasmic particle (it cannot be called a molecule) is resolved into a series of more simple compounds none of which can in any sense be called protoplasm. This fact is illustrated by this picture [illustrating] of a protoplasmic particle which has been broken asunder. It will be seen that the various chemical compounds are grouped around a central nucleus, which represents the protean basal substance which holds the groups together.

The physical properties of protoplasm must be studied in the cell, which is the only form in which the substance is known.

The cell is the unit of organized matter. In a diagram of a cell [illustrating] it will be observed that the central portion is occupied by the nucleus. This part of the cell is the most important ele-

ment of the organism. The nucleus contains the chromatin, and this substance takes an important part in the reproductive processes in the cell.

The cell is an organism in itself, as is illustrated by the lowest forms of free living cells, best shown in amoeba. These various pictures [illustrating] of this lowly animal demonstrate that it is able to perform any and all the functions of a living organism. Such a cell is called generalized. In the higher organisms the cells which form the body tissues have become specialized. If one conceives of an animal of two cells, the question at once arises as to the purpose of the added cell. Here in this picture [illustrating] you observe such an organism; how is it to be interpreted? When you know that one of the cells is an ovum, you know that the other cell is a sustaining cell, or as it is called, a nurse-cell. This is the first expression of the principle of specialization. The ovum cell has for its function reproduction, and the added cell is there to attend to the vegetative function, thus leaving the ovum free to attend to the important business of propagating the species. This principle of specialization is seen in various stages of expression in the body cells, where whole groups of cells are set apart for the various functional activities of the body; such groups are called organs. The cell, as it becomes specialized, loses its power of reproduction, until in its highest expression in the nerve cell this power is entirely lost, and the nerve cell cannot reproduce itself. Organs are groups of cells massed together for special functions, all composed of protoplasm, acting under the influence of stimulation. The body is preserved and kept in its integrity by the process of multiplication of cells. All reproduction is a process of cell division, and was once thought to be a very simple process, involving the simple splitting of the cell into halves, each becoming an individual. It is now known to be very complex.

In the lower, unicellular forms, the division of the cell means the reproduction of the entire organism. In the higher, multicellular forms, where groups of cells

are to be associated, for functional purposes, into organs, the process is immensely more complicated, but still is cell division. It begins at the very inception of the organism and is preceded by a remarkable set of phenomena described, collectively, by the term fertilization.

Fertilization is accomplished by the union of two cells, one having its origin in the ovary of the female, the other in the testes of the male, the ovum and spermatozoon respectively. The uniting of these two cells always precedes reproduction, and was formerly supposed to be essential to it.

Before attempting a description of fertilization, it will be necessary to present an outline of cell division or mitosis. A cell consists of two essential parts, the cell body and the nucleus. The cell body is called cytoplasm and contains a very important and active element called the centrosome. The nucleus contains a substance known as chromatin, consisting of masses of a peculiar form of protoplasm that takes the basic stain very readily and deeply, hence its name. Just previous to the division of the cell this substance becomes transformed from a mass into a series of rod-like bodies known as chromosomes. In the final division the resulting cells take one-half of the number of chromosomes resident in the nucleus, which, in the subsequent growth of the daughter cells, multiplies in amount until each cell contains the same amount of chromatin possessed originally by the parent. The chromosomes are constant in number—for, so far as they have been investigated, the body cells of each species of animal are a plant—and seem to form a very necessary constituent to the life and integrity of the cell in its relation to the organism.

Fertilization consists of the union of the ovum and spermatozoon, by which process the chromatin of two individuals is brought together in the same nucleus, which thus contains a part of the important element from each of the parent cells, one being maternal and the other paternal, which by a series of very ingenious experiments by Wilson, Dreisch,

Boveri, Hertwig, Morgan, Clakins, and others has been demonstrated to be the bearer of hereditary characteristics from parent to offspring. Some of these experiments are sufficiently interesting to warrant their description.

It has long been known that certain animal ova are competent to reproduce parthenogenically (without fertilization), such as bees, aphides, and some crustaceans. This knowledge led Professor Loeb (California University) to suspect that the effect of the spermatozoon upon the ovum was in some way equivalent to chemical stimulation. He therefore subjected the eggs of the sea-urchin to the action of various chemical solutions (sodium, potassium, etc.), and found that such treatment brought about the desired effect of reproduction. This demonstrated that the spermatozoon had two functions, viz, to bring to the ovum the factors of paternal heredity, and to stimulate it to reproduction. It is further shown by Wilson that if, after the spermatozoon had entered the ovum cytoplasm, the ovum were cut in halves, one half containing the ovum nucleus and the other the spermatozoon, both halves would go on to reproduction, proving that the spermatozoon is as competent to reproduce as the ovum. It will be seen by this that the notion of sex is lost—and as a matter of fact the physiologic meaning of sex is not known and constitutes a problem for the future.

The need for conjugation is explained as meaning that the physiologic activity incident upon repeated division expends the initial energy, which is, in some mysterious way entirely unknown at present, renewed by the process. When it is understood that by artificial parthenogenesis, by chemical stimulation, reproduction only goes on to the larval stage of the organism experimented upon, and that the chromatin of the spermatozoon is needed for complete reproduction, the likeness of the two processes may be conjectured.

A suggestion of the meaning of fertilization may be gathered by a study of a process known as conjugation among the unicellular organisms. In a form that

has been studied extensively (paramecium), it is found that the cell will continue to divide through a certain number of generations constituting a cycle. At the end of the cycle, in order to continue to reproduce, it is necessary that two of the cells come together and exchange chromatin. This they do, after which they may go on dividing as before through another cycle.

But while the physiologic meaning of sex is not known, some recent experiments by Dr. Wilson seem to point to the possibility of an insight into the intricate phenomena associated with the process of sex determination. Dr. Wilson has shown that when the spermatozoon is matured in the testes, the nucleus of some of the cells contains an odd chromosome, and that the ovum that is fertilized by the spermatozoon bearing the odd chromosome always produces a female. It has also been shown that in the cytoplasm of the unfertilized ovum there are areas of differentiation which predetermine the part of the cell that is to produce the primary structures out of which the various organs of the body are to be developed. These are a few out of the many phenomena occurring in the living matter that seem to demonstrate the contention of the "neovitalists." Many more might be presented if time permitted.

All these processes are the results of the inherent properties of protoplasm, and are produced under the influence of stimulation. It would seem that behind these processes and actuating or guiding their movements under stimulation, there must be some controlling principle which is constantly making its influence felt and impressing itself upon the organism, plant or animal.

E. B. Wilson of Columbia says in this connection: "I am fully in accord with the neovitalists in their assertion that the phenomena of development and of life generally have not yet been reduced to a mechanical basis, and that they cannot at present be fully described in physico-chemical terms. It is certain that living beings exhibit structures more complex than any existing in the inorganic world, and different from them in

kind. It is possible, I believe, that living bodies may be the arena of specific energies that exist nowhere else in nature. I admit fully that the interpretation of development I have endeavored to outline does not exclude, but in some ways actually suggests, the existence of such energies. I should therefore even admit that the vitalists are wholly right in their contention that the vital processes are not at present explicable as the direct result of such energies as are observed in the non-living world."

Professor Dahlgren of Princeton says: "The question concerning the nature of life is involved in the study of protoplasm. Behind the phenomena of life, is there any law or principle other than the present laws of physics and chemistry that is responsible for the manifestations of the life phenomena? I believe there is, for in no other way can we conceive of the maintenance of so many delicate and variable phenomena, for so long a period, through so large a number of different conditions."

That many of the life phenomena have a direct sequence to some chemical or physical conditions does not convince us that such laws or conditions are the first cause of the phenomena.

The fact that life is maintained within certain chemical or physical conditions is not proof that such conditions are capable of maintaining it for even a short time. The mathematical law of probability and chance shows the impossibility of maintaining life for an instant on such terms, when so many interacting and dependent changes are constantly taking place. Its rigid continuance without lapse or exception is the only ground on which it can be discussed. That it is continuous is proved by the history of life in time.

Why, under normal conditions, do we always have harmony, symmetry, adaptation, and permanence of form and function?

That it is supernatural is not apparent. Any law which becomes established in nature, as such, by long continuance and intimate relation with existing conditions in nature, must be a natural law. Surely

this one has the closest possible relation to nature, and has had its continuance since the first speck of living matter appeared on this globe.

Discussion.

Dr. J. BETHUNE STEIN. I cannot say much regarding the subject which Dr. Bates has put before us in such a brilliant way this evening. Some of the questions presented are of interest for the dentist, as they explain some of the great problems of dentistry; for example, the development of the oral cavity. The dentist must have some idea of what has been given us tonight in order to understand the different tissues of the body and the process of differentiation and specialization in cells.

The question of the development of enamel is one that naturally comes into our minds after hearing this paper. We are led to some questions regarding the development and the structure of the teeth that we cannot understand unless someone puts the subject before us as we have just heard it. We should try to understand nature as a whole before we can understand it in detail. We should be familiar with the process of division or reproduction in cells, for then we can look in a clearer way upon that which concerns the origin of the enamel cells, its process of differentiation and specialization, and its final development into a hard structure.

We have heard that the nerve cell, at the expense of its specialization, cannot reproduce. All that it can do is to be stimulated, and it is endowed with irritability and conductivity. When we look at some structures in the mouth, especially the enamel, and regard the enamel prism as a cell, we should think of it as having gone through a process of differentiation and specialization of such a character that its very hardness is produced at the expense of many if not all functions in protoplasm, even life itself. In the future, possibly, we may change our minds again in regard to the development of this tissue.

Dr. BRISTOL. I want to thank you for

asking me here tonight, and for letting me know that Professor Bates was to speak. I have enjoyed his paper more than I can express.

As you perhaps know, I have been working somewhat along these lines, and to sit here tonight, sir, and hear you illustrate this so clearly, has been a new inspiration to me.

Dr. Bates has presented to us the results of the best and most recent work that has been done in this matter of trying to explain the underlying physical forces of our life phenomena, and to get away from the suggestive notions—the things that ought to be, and the things that we create in order to explain something that we do not know. When we are puzzled in that way, we invent something which in our minds satisfies us for the present; I venture to say that everyone in this room has done that at some time.

It would not be good form to discuss a paper and agree with it entirely. I want to call your attention to another side of this subject—to the fact that history repeats itself, and is repeating itself today in the very forefront of investigation. If we go back about one hundred years, we find a set of men in Europe, with Albert von Haller at the head, who said that the germ is simply a miniature of the adult; that fertilization is nothing but supplying a certain something or other which will cause that germ to expand, not to grow, but to increase its size and issue forth as the animal; the followers of this theory were called the pre-formationists. Under that notion, an elephant existed *in minimo* in the germ cell. Every hair, every muscle, every blood corpuscle was there—everything in the animal existed in the germ, only in a very small way; and more than that, all the elephants that would descend from that elephant were there.

That theory broke down under the invention of the microscope, and two German scientists whose names are somewhat similar to their manner and their methods—Von Baer and Wolff, said that was nonsense; and Wolff published the first picture of the growing hen's-egg. There is a formless, soft mass which

gradually takes shape, and increases, and adds new and unlike parts to itself, and finally there is a change. That was the so-called theory of epigenesis.

But even today, with our microscopes and our improved technique, we are repeating the same experiences that scientists have gone through one hundred years ago, as far as the philosophy of reproduction and development is concerned.

Professor Bates has given you the viewpoint of the mosaic theory, the followers of which, as Professor Wilson's work and pictures have shown, are trying to divide the egg before its fertilization into zones and parts; after cleavage sets in, certain parts are modified and assume a certain form.

Whitman and Lilley of Chicago, and their followers, take another ground, saying that this is not sufficient.

There are three possible results: The mosaic theory or the other may be right, or there may be some other theory advanced which will combine those two in some way or other. All this work is being conducted on a purely objective basis, and here and there, little by little, the purely imaginary phases disappear, and so by these processes of investigation we may expect to get still nearer to an objective physical basis for explaining the phenomena of life.

Dr. JENKINS. The society is to be congratulated on the presentation of this subject, and I think you will all agree with Professor Bates in the compliments which he has paid to the great living Americans who are working in this field.

As to the subject of evolution, and the principle of natural selection, some material has been recently published in the medical journals crediting with this discovery a comparatively unknown American, William Charles Wells, born in South Carolina in 1857. He wrote a paper in which was embodied the principle of natural selection, and as a classic presentation I think his essay has never been surpassed.

A very hearty vote of thanks was tendered to the essayist for his splendid lecture.

The Secretary announced with regret

the death of Dr. A. W. Harlan, an active member of the society. The President and Dr. W. W. Walker also made some remarks in reference thereto.

On motion a committee of three was then appointed to prepare suitable resolutions.

HERBERT L. WHEELER, *Sec'y.*

SUSQUEHANNA DENTAL ASSOCIATION.

Forty-sixth Annual Meeting, Harvey's Lake, Pa., May 18-20, 1909.

TUESDAY—*Morning Session.*

THE forty-sixth annual meeting of the Susquehanna Dental Association was called to order in the ballroom of Hotel Oneonta, Harvey's Lake, Pa., by the president, Dr. C. C. Laubach, Scranton, on Tuesday morning, May 18, 1909, at 10 o'clock.

Rev. Dr. L. E. VAN HOSEN, Harvey's Lake, invoked Divine blessings on the deliberations of the association.

Dr. A. W. SPENCER, Carbondale, welcomed the members of the association to the meeting.

Rev. Dr. VAN HOSEN, on behalf of Harvey's Lake, then welcomed the association to Harvey's Lake.

The next order of business was the annual address of the president, Dr. C. C. LAUBACH, Scranton, which was referred to a committee consisting of Drs. C. S. Van Horn, Geo. Luxemburger, and W. E. Davis, to report at a later session.

The next order of business was the calling of the roll by the financial secretary, Dr. Geo. C. KNOX, Scranton.

Dr. E. J. DONNEGAN, the secretary, then read the minutes of the last meeting, which were approved as read.

Dr. Donnegan read the resignation of Dr. O. J. Marcy, Scranton, and on motion the resignation was accepted.

Dr. Donnegan presented two communications from the Committee on Reorganization of the State Society, and Dr.

Brogan moved that the discussion of the communications be postponed until the Wednesday morning session. The motion was carried.

Dr. Donnegan moved that the DENTAL COSMOS be made the official organ of the society for the present session. The motion was carried.

The meeting then adjourned until the evening session at 7.30 P.M.

Evening Session.

The meeting was called to order Tuesday evening at 7.30 by the president, Dr. Laubach.

The first item of the program as announced by the president was the reading of a paper by Dr. H. C. FERRIS, Brooklyn, N. Y., entitled, "The Anatomical and Physiological Consideration of the Organ of Mastication."

[This paper is printed at page 1357 of the present issue of the COSMOS.]

Discussion.

Dr. P. B. McCULLOUGH, Philadelphia. You have given me a rather difficult task in asking me to discuss a paper very little of which admits of any difference of opinion. The material which the essayist presents is the result of painstaking technique, and the conclusions are of the same standard.

That part of the paper which treats of orthodontia in particular is interesting

because the essayist is an expert. To intelligently absorb the truths reflected by the models on the screen it is necessary to keep in mind the possible injurious effect of extensive tooth-movement on the pulp and peridental membrane. Models were shown of a woman of thirty-two years, where the second molar was in contact with the second bicuspid, and these teeth were moved apart until space sufficient for the first molar was obtained. This, I think, cannot be done at that age without impairment of pulp function.

As to whether salivary analysis is properly a part of the orthodontist's work, I will not pass upon. I am satisfied to accept that better digestion is secured by the mouth with a good masticatory apparatus than by a bad one, without resorting to the test tube to prove it.

I have often wished that I might have the help of a salivary expert in diagnosing local disease manifestly of constitutional origin, so that I might intelligently treat the conditions.

Dr. N. H. MYERS, Plymouth. When we came to histology and its study as an adjunct of dentistry, we thought we were getting down to very nearly the bottom of things, but when we take up a subject such as Dr. Ferris has presented to us this evening, I must admit we are getting much beyond what I had ever thought dentistry would attempt to do. I admire Dr. Ferris very much, and have enjoyed his demonstrations exceedingly, especially the one showing the vascularity of the peridental membrane. I have never seen slides that have illustrated this quite so well as did the ones shown this evening. This is a subject that has interested me considerably for some time, especially since there has been some difference of opinion in relation to the circulation of that region; but these slides show very clearly and accurately what we have been trying to learn for a number of years.

Dr. W. A. SPENCER, Carbondale. The essayist's remarks on the action of the muscles in regard to malocclusion were somewhat novel to me, and in the future when seeing a peculiar expression on

any person's face I shall wonder what teeth have been lost. In regard to the analysis of the saliva, while I feel that the ordinary dentist will not be able to accomplish much in that line, I am glad to know that someone has taken up the work, and has accomplished something that will be of benefit to us.

Dr. H. D. WHITMARSH, Binghamton. It occurs to me that though most of us are not specialists in the subject treated by the essayist of this evening, still we can take a lesson of increased observation from such work that will benefit us in every line of study. Although the specialist may present to us work which, because of conditions surrounding the busy dentist, lies beyond our scope, we can gather from him many thoughts that will help us in our own labors. Like Dr. Spencer, I have been impressed with the effect of the muscles on the face when subjected to abnormal conditions, and it will be a stimulus to me to be more careful in my observations of such conditions of the face.

Dr. MYERS. I would like to ask the essayist a question. You presented some specimens of saliva showing digestion, etc. Do you think that the patient's excitability during the time when he was producing that saliva had anything to do with its digestibility? I know from my own experience that if I become a little excited I cannot masticate anything and can mix but very little saliva with my food, because very little saliva is flowing at such a time. I wondered if the same might not be the case with some of our very timid dentists at the time of collecting these specimens for demonstration.

Dr. FERRIS (closing the discussion). In answer to Dr. Myers' question, I do not doubt in the least that under nervous excitement during mastication the patient would secrete an increased quantity of parotid saliva, but as the gentlemen all underwent the same procedure, unless their sensibilities are very different, I should hardly look for any great variation, particularly in view of the fact that by this method we have been enabled to detect acknowledged pathological

states, which could hardly be coincident.

In reference to the blood supply of the crypts or tooth capsules, I was struck with this subject as presented by Dr. Stein before one of our New York societies, and asked the privilege of showing these slides at this meeting. Dr. Stein's object in producing these particular slides was to controvert the idea that the capsule of the growing tooth was supplied from the alveolar surface, but rather from both the alveolar surface and the inferior or apical region. I have never seen a slide showing the opposite phase, but in one of our text-books used today in the schools I have seen illustrations of sections where there was no arterial connection apparent. I have studied these specimens under the magnifying glass, and could distinguish between the artery and the tendon, and was convinced that the inferior dental artery was connected with the lower section of the capsule of the growing tooth. The old-time diagrammatic illustrations led us to believe that this is not the case.

In the case cited of a patient of thirty-two years, the molars on each side were not moved distally, but were held stationary, and if I could show you the models you would see that the molars are now in the same position as when the case was commenced. What took place? I moved all the anterior teeth forward. This is not readily achieved, and the bad results which the early orthodontia workers obtained were due to the lack of knowledge of the histology of the parts. If we would accomplish anything in orthodontia, we must study the parts which we are moving. We cannot practice orthodontia from an empirical standpoint by simply viewing a case from the external surface. We have to examine the case with the X ray three or four times during the regulating process, and in older patients it can be determined whether the tooth is being moved. X-ray pictures are easily obtainable and prove a source of great satisfaction. I believe that a tooth can be moved at any age without danger to the pulp, and

I have not seen any disastrous results when proper care was taken.

I have never yet had a picture which showed that I had cut off the circulation at the apical end of the tooth-root. You can apply force to a canine and move it immediately, about an eighth of an inch within two weeks' time, thereby producing a dead tooth. But if you take three months this would not occur.

With reference to clinical results, I must say that these are a tender point with me. We have always drawn our conclusions from clinical results without scientific record, and that is the way medicine has been doing; but if you have closely read the medical literature you will have noted that in medical colleges throughout the world empirical medicine is passing out, and a man has to know pathology in order to be a practitioner today. Medical men no longer look at a patient, take his pulse and respiration, and write a prescription. If the physician would treat a case intelligently, he must study the etiology of the disease and be able to treat it from the standpoint of physiological chemistry; he must make a chemical analysis of the intestinal secretions, a microscopical examination of the blood, urine, and feces—and I would add, of the saliva. If that particular subject which I have just mentioned, *i.e.* microscopical examination of the feces, is of sufficient importance to be made a specialty of, I think it is nearly time that the dentist, who takes care of the front door of the alimentary canal, knew something of the bacteria of his particular region; and if we take better care of that portion, the physician may not have so much to take care of at the other end. I believe it is true, as Dr. McCullough says, that only one man in ten is sufficiently educated to take up scientific research work, but that does not mean that all should be educated to that point, nor does it mean that a man who does no research work is an inferior dentist, by any means. My idea is to encourage those men who are making particular efforts in this field, and to introduce into the profession the idea that some men should take up this work. If we had one man

in a city whom we could call a dental pathologist, who could examine specimens and indicate the treatment of patients who have acid erosion, with the teeth all melting away, we would be better off. As it is, we cannot touch such a patient, who may be a child of twelve years, owing to his hypersensitive condition. What are we going to do with such a patient? Frequently we have to give him up and let the poor child suffer. You are the dental specialist, the man who has charge of the masticatory organ, and you should undertake to give that child relief. If you understand the chemistry of the mouth, and will use your chemical knowledge consistently, with the assistance of the pathologist, you can so reduce the sensitivity of the tissues that you can handle such a case; but you must have scientific principles as your basis in order to accomplish this result. If you present yourself to a general practitioner with a pain in your stomach, he may give you temporary relief, but the pathologist would examine your stomach contents as to its chemical properties, and would be able to intelligently treat you as a result. There will come a time, and I hope to live to see it, when the dentist will be able to explain why in a certain case he prescribes a certain mouth-wash in order to accomplish a certain result, instead of taking every composite mouth-wash on the market, and making a hit or miss in his treatment.

The meeting then adjourned until Wednesday morning.

WEDNESDAY—*Morning Session.*

The meeting was called to order Wednesday morning at 9.30 o'clock by the president, Dr. Laubach.

The Secretary read a number of applications for membership, which were referred to the Board of Censors.

The next order of business was the election of officers for the ensuing year, which resulted as follows: H. M. Beck, Wilkes-Barre, president; V. S. Jones, Bethlehem, vice-president; E. J. Donnegan, Scranton, recording secretary; G. C.

Knox, Scranton, financial secretary; C. C. Walker, Williamsport, treasurer.

The next order of business was a talk by Dr. JAMES G. LANE, Philadelphia, entitled "The Shrinkage Problem in Gold Casting," after which the meeting adjourned until the evening session.

Evening Session.

The meeting was called to order on Wednesday evening, May 19th, at 8 o'clock, by the president, Dr. Laubach.

The first order of business as announced by the President was the reading of a paper by Dr. N. H. MYERS, Plymouth, Pa., entitled "Syphilis and Its Manifestations, Especially from a Dental Standpoint."

[This paper is printed at page 1397 of the present issue of the *Cosmos*.]

Discussion.

F. L. McKEE, M.D., Wilkes-Barre. Dr. Myers very kindly invited me to discuss his paper from a medical standpoint. I fully realize the responsibility which he has thereby placed upon me, and I cannot imagine anyone who is in the profession of medicine and surgery who would not be thrilled with pride at the opportunity to communicate the little knowledge at his command to his fellow workers in the dental branch of the profession. Although you are in a class distinct from the regular practitioner, our work throws us together almost constantly, and each is endeavoring to the very best of his ability to alleviate the sufferings and misfortunes of his fellow man. Suffering, bodily pain, and discomfort, agony both physical and mental, is thoroughly depicted in a serious case of syphilis. As Dr. Myers states, syphilis is designated a venereal disease, and is acquired by impure intercourse. This is the usual and common way in which syphilis is transmitted from the donor to the recipient, but there are many ways in which syphilis is spread among innocent victims, a few of which I will narrate.

Perhaps the best recorded clinical evidence of the inoculability of the secretions from mucous patches and ulcers of the mouth is that furnished by Mawry and Dulles of Philadelphia. It appears that James Keeley gained his livelihood by going from place to place, tattooing, for a small sum, all those deluded individuals whom he could induce to submit to such mutilation. Following his trail it was found that out of twenty-two individuals tattooed, fifteen had acquired chancre at the tattooed points, with subsequent syphilis. Keeley was in the habit of putting his needle into his mouth and mixing his colors with saliva. On examination Dr. Mawry found Keeley's mouth to be full of secondary syphilitic lesions.

In 1885, Thomas T. appeared at my office one morning in May, suffering from an ulceration of the second joint of the middle finger of the right hand. A silver probe was easily passed through the joint both laterally and perpendicularly. I inquired if he had been fighting and had been bitten. He stated that he had been in a scrap with one Charley S. The diagnosis was immediately cleared up, as I had foreknowledge in this particular case, Charley S. being a patient of mine and at that time having several nasty mucous patches of the mouth, as well as numerous fissures of the tongue. His oral secretions were swarming with *spirochæta pallida*.

Examples of communication and inoculation are: The friendly pipe, the wet-nurse, the snuff-box, the drinking-cup—including the communion cup—and kissing, a very unsanitary habit if the donor has a secondary lesion of the mouth. Indeed, the examples of communication are almost limitless. I know of at least half a dozen fellow physicians who have been inoculated by way of finger abrasions with the secretions of secondary lesions from patients. Therefore, as members of the dental profession, it behooves you to consider well the mouths of your patients, lest you innocently acquire syphilis, and furthermore, lest you through gross carelessness inoculate some innocent patient through the careless use

of dental instruments. I contend that after each case and before they are used again on any patient, all instruments should be rendered aseptic, either by boiling and rinsing in alcohol, by allowing them to lie a few minutes in a 5 per cent. solution of cresylic acid and rinsing in alcohol, or by leaving them over night in a carbolic acid solution.

Many nose-and-throat specialists immediately wash their instruments in a strong solution of sodium bicarbonate and rinse in alcohol, but I consider either of the former methods best, as they will not injure the instruments.

The comparison between syphilitic sores of the mouth and epithelioma has been thoroughly considered in Dr. Myers' paper, but there is another condition that is more common than the cancerous condition mentioned, and that is tuberculous ulcers of the fauces. The differentiation between a specific and a tuberculous ulcer of the fauces is sometimes very difficult, and the following points are well worth remembering:

As a rule the specific ulcer is shallow, grayish, with a regular margin, not very tender, and does not cause dysphagia; on the other hand, a tuberculous ulcer is deeper, more slough-like, irregular in outline, has an outer inflammatory zone, is exquisitely tender, and causes great pain on swallowing. A laryngeal examination may reveal a tuberculous condition of the cords and larynx, and, as doctors of dental surgery, you should remember that you are not permitted to question all patients with suspicious mouths and throats as to their antecedent sexual relations.

The value of the demonstration of the *spirochæta pallida* is manifest in this connection—as elaborated on by John T. Garahty, M.D., instructor in genito-urinary surgery in Johns Hopkins University, and published in the *American Journal of Dermatology and Genito-urinary Diseases* for February 1909. Since the first publication of the discovery of the *spirochæta pallida*, by Schaudinn and Hoffmann, three years ago, an enormous amount of work has been accomplished by different observers,

and they all verify and confirm the findings of the discoverers of that bacillus.

Although the *spirochæta pallida* has so far not been cultivated on artificial media, and Koch's requisites have not been fulfilled, nevertheless the evidence of the *spirochæta pallida* being the etiological agent in syphilis has so accumulated that it is generally recognized as such by those competent to judge. The evidence may be briefly summed up as follows:

(1) The presence of *spirochæta pallida* and the absence of other organisms in the stillborn fetuses of hereditary syphilitics.

(2) Correspondence in the number of *spirochæta pallida* with the extent of the disease in the syphilitic organ, and the absence or scarcity of that bacillus in organs not diseased, as has been noted by several investigators.

(3) The almost constant presence of *spirochæta pallida* in the primary lesions of men and monkeys.

Schaudinn found it 70 times in his last 70 cases of primary and secondary syphilis.

Sobenheim found it in 50 cases of primary and secondary syphilis.

Metchnikoff and Roux in their experimental work on apes found *spirochæta pallida* 23 times in 31 infected animals, and they have never found any *spirochæta* other than *spirochæta pallida*.

Hoffmann found *spirochæta pallida* 14 times in 14 chancres.

Mulza found it 20 times in 22 syphilitic cases, and learned of 32 chancres in which it had been found 30 times.

Flügel found it 28 times in 29 chancres.

Herxheimer and Hübner found it 16 times in 17 cases of primary and secondary syphilis.

I have quoted at considerable length these authors and their findings in order to show you in what a small proportion of syphilitic cases negative findings occur in the experience of skilled observers.

(4) The fact that *spirochæta pallida* has never been found except in syphilis.

(5) The presence of *spirochæta pallida* in syphilis in the most distant countries.

(6) The lesions in which *spirochæta pallida* is found most frequently—and which are the most contagious in acquired syphilis, being often met with in your dental work—namely, the mucous patches of the mouth, the condyloma, also the chancre.

(7) The *spirochæta pallida* has been found in all the lesions of syphilis, in the blood of the secondary stage, and even in the urine of syphilitic nephritis.

(8) Mercury, which is the only drug that can cure syphilis, causes the rapid disappearance of *spirochæta pallida*.

Those who see many venereal sores will agree with me that in a great number of cases it is hard to distinguish between chancroid and chancre. The syphilitic sore may be nothing more than a small abrasion lasting only a few days, and no suspicion of its true character may arise until it is revealed by secondary symptoms that develop later. Many times I have seen chancroids that later proved to have been syphilitic. The diagnosis being uncertain under ordinary conditions, I have for over a year examined all suspicious sores, and make it a rule to search for *spirochæta pallida*.

The technique employed is as follows:

The sore is cleansed with soap and water, rubbed with a small piece of gauze until small bleeding points appear. Pressure is then applied by compressing the lesion between the thumb and finger, which will stop the active bleeding, and an almost clear serum will exude, from which a smear is made. The slides are first dried in the air and covered completely with Hastings' stain; after a minute distilled water is added until a metallic film is formed and the smears are allowed to stand for five more minutes, when they are quickly washed with running water and dried. The same technique is employed in making smears from other syphilitic lesions. In skin lesions the epithelium must first be scraped off. The Hastings stain is used exclusively for the reason that it is quite easily ap-

plied. The *spirochæta pallida* stains a faint blue, occasionally with a pinkish tinge. *Spirochæta refringens* stains deep blue. The Hastings stain is preferred to the Giemsa, as the method is simple and completed in a few minutes, and the staining is more intense.

You can appreciate the advantages arising from making an early diagnosis of a given case, placing the patient on immediate anti-syphilitic treatment and avoiding the early roseola rash and alopecia that will occur if left from four to eight weeks to develop. This cannot be done in all cases, as the average syphilitic will doubt and hope against syphilis. No matter how thoroughly you are convinced, or how thoroughly you try to convince him, he seems to think that he may by some manner of means escape a three or four years' course of treatment of this dread disease.

But permit me to tell you that syphilis, in this community at least, is not such a fearful disease. It is mild; hundreds of individuals pass through it unharmed in tissue, in feature, in function, reach a green old age, and die with some intercurrent affection. I have patients that have been under observation for thirty years; they have married and reared families of healthy children, who have also married, rearing healthy grandchildren, without the semblance of a specific blemish. My patients are required to take three or four treatments each year, in April, May, October, and November. I recently saw a patient of mine who had a chancre in 1882, followed by the regular secondary symptoms. He never developed tertiary syphilis. He had been required to take a three years' course of treatment, as recommended by my professor on venereal diseases, E. L. Keys of Bellevue Hospital, N. Y., and each succeeding year up to five years ago, when he dropped out of sight, until last month I was called and found him in convulsions. I catheterized him and found that he had suppression of urine. Treatment: Murphy's method—proctolysis with normal saline solution; iodids were given in large doses internally. The patient was on his feet in less than a week.

I desire to impress upon you the necessity of long-continued treatment, thus preventing late syphilis.

Dr. Myers' remarks, concerning the teeth are very accurate and well defined. We medical men still cling to Hutchinson's "test teeth," as he calls them; these are the two central permanent incisors of the upper jaw. The deciduous teeth do not show this typical peculiarity of structure, and no other teeth can be relied upon to indicate the presence of hereditary syphilis.

The first set of teeth may be chalky and succumb to rapid caries; the second set may also be very defective, stunted in growth, disposed to rapid caries, some in malposition or altogether out of place. On the other hand, a child may be markedly syphilitic by inheritance, and yet his teeth may be perfectly sound. The "test teeth" are found in connection with inherited syphilis. The two central incisors are smaller than normally, usually converging or diverging a little. The incisal edge is narrower than the base of the tooth, making them peg-shaped, and along the lower edge they are uniformly notched, with a single broad notch at or about the center of the frontal aspect of the tooth, which is best observed when the mouth is slightly opened, and the upper lip retracted. These teeth chip off easily, wear down with advancing age, and finally lose their characteristic appearance.

Dr. T. W. THOMAS, Wilkes-Barre. This is the first time that I was ever present at a dental convention when this subject was discussed. I am very glad that Dr. Myers has taken so much care in the preparation of his paper, and am pleased to have heard Dr. McKee's discussion upon it. If anybody needs light on this subject beside the physician, it is the dentist. I am, however, a little inclined to question whether Dr. Myers is correct in saying that the early history of this disease is shrouded in mystery. Shortly after the discovery of America this disease ravaged Europe, and it was called the American disease. It was said by the medical authorities at that time that the sailors took back something so

that the people of Europe might remember that there was such a place as America. At any rate, there are early records telling of this disease. In the sacred Hebrew writings, in the book of Deuteronomy, we find certain comments made by Moses that render it very evident that syphilis was prevalent at that time. It was certainly prevalent when the book of Psalms was written. Anyone who is interested in these records and who will read the thirty-eighth Psalm will come to the conclusion that if the author did not have syphilis, he had a vast knowledge of it, because the symptoms are very well described there.

Since syphilis manifests itself, after the initial sore, in the oral cavity, it is very necessary that every dentist be able to recognize it, and take every precaution to prevent it from spreading to himself as well as to his patients. Dr. Myers' and Dr. McKee's remarks are therefore of the greatest value. Certainly, sterilization of instruments is demanded. One of the most unpleasant incidents which I ever heard in connection with a dentist happened some years ago in Wilkes-Barre during a dental convention. A local physician of good repute stated that not long before that time a woman had come to him with syphilis, who asserted that she had contracted it from contact with the dirty instruments of a dentist.

Dr. Myers remarked that it is necessary to have an abraded surface in order to secure the disease. In Dr. J. W. White's and Dr. Martin's book on this subject, the following passage occurs on page 305: "It is possible that syphilis may be acquired from contact with the virus through the unbroken surfaces where the epidermis is extremely thin, but cracks and fissures greatly facilitate the contraction of the disease."

Dr. Myers made reference to mutual courtesy between dentists and physicians. I would ask you to consider for a moment how many physicians whom you know and who have been treating for syphilis a patient whose teeth you were at the same time treating, have told you that that patient had syphilis?

The most pleasant phase in what read-

ing I have done about syphilis is the assurance that there are at least two specifics: If a man takes quinine long enough it will cure malaria, and if he takes mercury long enough and in proper doses, syphilis will be attenuated, so as not to show any trace of it in generations to follow, or it will be cured.

Dr. W. S. KELLEY, Wilkes-Barre. I would mention a few things in regard to this subject from the dental standpoint. I make it a practice, whenever I examine the teeth of a patient, to look at the tongue, the throat, and the general condition of the mouth, and if I find any suspicious sores in a man I question him closely; and if it is in a woman, I make a more careful examination of the mucous surfaces of the mouth. We find that the hard chancre has very hard edges, and is more copper-colored, while the soft chancre has softer edges with a somewhat poisonous look, and is filled with yellow substance, and we consider the soft chancre more contagious than the hard one. If we find by examination of the patient's mouth that they have syphilis and know it but have not told us so, it is proper to dismiss them. Not long ago I had to extract several teeth in a woman; a little boy came to me with a message from a Wilkes-Barre physician advising me to be very careful, because the woman had syphilis. He said that she had contracted it from her little girl. Apparently somebody had kissed that little child, and had infected her with syphilis, and the mother had contracted it from her daughter. The mother some time afterward gave birth to a child that had congenital syphilis.

We are unfortunate in not having time to go specifically into this work for diagnosis, or to study the conditions, therefore we have to determine at a glance whether the patient has syphilis. If I find any sores in the mouth, I swab it thoroughly with tincture of iodine and glycerin, one part of tincture of iodine and two parts of glycerin, touching every red spot, before I go to work on the patient. Everything is against us in our diagnosis of incipient syphilis, as it has to be instantaneous, and unless we have

some notice from the physician we have to take the risk. It is of course unnecessary to say that instruments should be sterilized. I never clean teeth for a patient without taking a piece of cotton saturated with iodine and glycerin and thoroughly wiping it around the necks of the teeth as a safeguard. That is about the only thing you can do.

Dr. H. C. FERRIS, Brooklyn, N. Y. I was very much interested in the essayist's paper. He has covered the ground completely, but I am under the impression that some of his findings are rather misleading. With regard to the reproduction of the disease by the spirochæta pallida, as mentioned by Dr. McKee in his discussion, Metchnikoff has taken the spirochæta from an infected ape, and has reproduced the disease from a culture made from the primary infection, which seems to me to be more scientific than anything that has been done to date. The serum of the infected monkey has been injected into the veins of another healthy monkey, and that monkey developed a chancre.

The essayist spoke of the antiseptic care of the mouth; one of the speakers has also mentioned the use of iodine as an antiseptic. I treat a number of syphilitic cases, and it is my practice to use an antiseptic spray, not of the tincture, but a solution of potassium iodide. I presented this method of treatment to you a year ago, and it is being followed by a number of hospitals in New York city today. The aqueous solution can be more freely used over all the surfaces, and will produce in primary lesions of the oral cavity a very marked beneficial result. Unfortunately, the mercury treatment of the medical practitioner leaves the patient salivated, and a necrotic condition of the alveolus results. In these cases the physician should work with us and give us the opportunity to treat the oral cavity antiseptically and to fill all carious cavities so as to reduce the effects of the growth of these bacteria, which it is admitted by all specialists can be found in the oral cavity in vast numbers, even though there may not be any lesion in the mouth. An examination of the saliva

would show when to stop the treatment. Local antiseptic treatment and efficient hygienic care of the mouth will be of assistance to the medical practitioner in every form of disease.

In regard to erosion of the teeth, I have observed in a family one child out of eight that was affected with erosion of the molars and the central incisors, both upper and lower. Upon careful study of the early history of this patient, I found the erosion to be due to disturbed metabolism, resulting from some specific diet in the child's early life. Children are frequently afflicted with convulsions due to some systemic disorder which interferes with the metabolism and, I believe, with the enamel-forming organ in the crypt of the growing tooth. If that disorder in the circulation interferes with the general growth of the whole system, why should it not affect the enamel organ as well? I believe the impression which the essayist has given us, that such teeth are manifestations of syphilitic lesions, is undoubtedly true in a number of cases in which we can trace the disease, but I believe that we should be very careful in suspecting a family of the disease because the children exhibit these particular marks. In cleft palate and hare-lip cases we have a clearer embryological illustration of the ravages of syphilis, and there we have very little chance of making a faulty diagnosis, although a number of investigators in the field of cleft palate have shown that this congenital condition may arise from the nerve centers that are affected in the mother during gestation.

We should be very careful of our own hands, in our general antiseptic methods, and of our patients during our everyday life. In handling syphilitic patients I make it a practice to operate with moist hands. I have on a glass table near me three bowls, one containing a two per cent. solution of formaldehyde, one of a two per cent. solution of carbonate of soda, and the third a three per cent. solution of camphenol. If there is any suspicious lesion of the mouth, the mirror is immersed in the formaldehyde solution before being used in the mouth, and is

washed off in the soda solution before being re-introduced into the oral cavity. The camphenol solution is used to free the hands of all saliva. If the surgeon in treating these conditions is so particular as to wear rubber gloves, it is well that we, who are coming in contact with the saliva charged with these bacteria, should during an operation of from fifteen minutes to half an hour free our hands frequently of the mucus which carries these organisms. The camphenol will dissolve free cells in the salivary secretions, and will aid in keeping the surfaces of our hands clean. It is very simple to carry out this practice; the hands are protected, and your operation may be continued with a fair amount of safety for yourself as well as for the patient.

Dr. E. C. KIRK, Philadelphia. I want to congratulate this society, as I congratulate myself, on having listened to such an interesting and valuable paper and such an enlightening discussion. The subject of syphilis in its relation to dental practice is one which I think could be profitably discussed very frequently, and while the question has been very fully gone over, yet there are one or two points that occur to me that may be worth emphasizing in this relationship.

I have wondered whether the syphilitic impress which is being made upon all of us—for doubtless none of us could go back many generations in our ancestry without finding the syphilitic impress at some point—whether in the course of time we as a nation or class of people are not developing a certain tolerance for syphilis. This question was impressed upon my mind because I have had considerable to do with the treatment of this disease from the dental standpoint, and on two occasions, quite apart from any choice or intention on my part, I wounded my tissues in operating in syphilitic mouths where the disease was in a highly contagious state, and yet I am thankful to say I have never been infected. On one occasion, while I was operating in a mouth in which mucous patches were well developed—that of a man who gave a syphilitic history and

who came to me for the purpose of having his mouth put in order so that he could undergo a course of mercurial treatment—I accidentally wounded my finger by passing a plugger loaded with infected salivary secretions through the rubber dam, puncturing my finger. I can assure you that I spent several weeks of mental uneasiness from fear that I had infected myself. Of course I promptly sterilized the wound, and fortunately no subsequent manifestations occurred. On another occasion in a known case of syphilis, sent under the same circumstances as the case just mentioned—by a physician, for the mouth to be put in order for a proposed course of mercury—while scaling the teeth a piece of tartar flew up, struck the under surface of my glasses and caromed back into my eye. I again experienced several weeks of mental distress from that accident. I immediately washed my eye with distilled water and a boric acid solution, and never had any trouble from that. After having operated for a great many syphilitic cases that I knew about, and undoubtedly a good many that I did not know about, I have wondered whether in the course of our civilization we have become inoculated by degrees, so that we have been developing a tolerance which will in time reach the status of immunity to this terrible disease. In reading the history of the disease as recorded in the early writings of the older observers with regard to the devastating character of syphilis, we must conclude that the type of its clinical expression has changed or the virus has become somewhat attenuated, for its modern expression is certainly less virulent than that described by older writers.

I have seen, as you have, many cases of syphilitic perforation of the hard palate, yet have seen but one case just on the point where the disease was in that active stage in which necrosis of the tissues was about to take place—and did take place within the next twenty-four hours, forming the palatal perforation. It was such an unusual case that I called in Professor Truman, who has been in practice probably since before any in this

room were born, and I asked him if he had ever seen a case like that? He said, "No, it is the first I have ever seen in just that stage where the palatal tissue was just about ready to drop out."

We see a great many of these cases in our university clinic in various stages, and they come to us in private practice if we will take them; and there comes up the point—"if we will take them." I speak of that in order to discuss the question from another aspect. I have discussed the matter with many dental practitioners, and they all view these cases as something to be shunned. We want to get rid of them; there is a widespread tendency among dentists to feel that it is more or less of an insult for a patient to come into the office with this disease. I think that is the wrong attitude of mind, one begotten of ignorance. I believe that attitude of mind which leads us to handle these cases in fear of infection or of transmitting the infection is altogether a groundless one where one understands how to intelligently handle them. More than that, I think it is the moral duty of every dental practitioner to care for these cases the same as for any other. We are not concerned as a profession with the moral question involved in syphilitic infection, though we are as individuals, or ought to be—but professionally it is none of our business from a moral standpoint how a patient obtained this lesion. He comes to us as a case of suffering humanity, he comes for relief, and we have no more right to withhold treatment, to withhold whatever relief we can give in these cases, than the physician has the right to refuse to prescribe for such cases. Therefore we should know how to handle them.

Another thing I find more or less suggested in dental meetings when this subject is under discussion, and that is that we should be forewarned about it, that we should know in advance that the patient is a syphilitic; that we have had some sort of confidence game played upon us when a syphilitic patient comes to us for treatment without our being forewarned, the breach of confidence being that we are subjected to infection without our knowledge. The very fact that there is

such a disease as syphilis, and that it is communicable through the mouth secretions is the one and sufficient reason why the antiseptic handling of every case, specific or not, should be the same, why we should always be as careful in the sterilization of our instruments as though every one was syphilitic. The means required for protection against syphilis should be the modern standards of sterilization and the routine safeguard in the treatment of all cases of whatever character. One certainly would not want to employ a surgeon who was careful only in his methods of sterilization for laparotomies, for example, and for some other operation was neglectful.

There is a feature of this disease that has not been dwelt upon at length, and that is the cases of mercurialization that come to the dentist in syphilitic patients undergoing treatment. In that relationship the dentist and the physician come into close contact. One of the most enlightening papers on that subject of which I have any knowledge is a paper which was read at the Third International Congress in Paris in 1900 by Dr. Loup, and which was published in the DENTAL COSMOS (vol. xlii, page 1300), a paper entitled "The Rôle of Mercury in the Production of Mercurial Stomatitis." After a very careful and extended scientific investigation of the subject Dr. Loup came to the conclusion that those cases of necrosis of the alveolar border and ulcerative condition of the gingival margins and the soft tissues of the mouth that occurred under the excessive use of mercury were brought about not by the mercury, *per se*, but secondarily. That is to say, the mercury reduced the vital resistance of the tissues involved to such an extent that infection of these tissues by the mouth bacteria occurred; and the discussion brought out the fact that in cases where the mercurial stomatitis had gone on even almost to the point of producing necrosis or sloughing—that by rapidly increasing the amount of mercury, the elimination of the latter would take place through the saliva, and the saliva would thus take on an antiseptic value which before it did not have. In other words, a person may develop so-

called mercurial stomatitis from continual small doses of mercury without the mercury showing in the saliva. I have examined saliva from people who were being salivated and have never yet been able to detect mercury in the secretions, but Chompret contends that if the mercury is increased to the point where elimination takes place through the saliva, we then have an antiseptic property developed in the saliva sufficient to destroy the infection from ordinary mouth bacteria. Loup also supported his view by using antiseptic mouth-washes of sufficient strength, and he went so far as to attempt to cure mercurial stomatitis by the use of a 1:2000 sublimate solution. That is to say, he cured mercurial stomatitis with mercury bichlorid by using it as a local application in the mouth to destroy the bacteria.

Before taking my seat I wish to say a word in regard to the appearance of the Hutchinson teeth as being the only dental lesion that we can say is pathognomonic of hereditary syphilis. Dr. Cavallaro of Naples has published recently a series of articles in the *DENTAL COSMOS* which I think are the most extensive that I have ever read upon the dental lesions of syphilis, and he has included a great many malformations of teeth other than those described by Hutchinson, which he says are distinctly syphilitic in origin. I have followed his argument closely, but cannot bring myself to agree with him that certain lesions which he described of the enamel structure are syphilitic, or are necessarily in all cases syphilitic. I agree with Dr. Ferris that it is extremely dangerous to make the diagnosis of syphilis upon these various malformations of dental structures, other than the well-known one described by Hutchinson.

It is to our discredit as a profession that so little has been done in dentistry in regard to the study of the Hutchinson teeth. In nearly all works on syphilis in which Hutchinson's teeth are referred to we find the illustrations of Hutchinson's teeth simply reproductions of the original drawings which appeared in Hutchinson's work in a paper read before the Odontological Society of Great

Britain, somewhere about the year 1860. The only other dental writer who has added anything to that description is Magitot, and he also copies several of Hutchinson's pictures. It is easy enough to find perfectly distinctive and characteristic teeth of this type. A study of these teeth should be made which would illustrate Hutchinson's teeth so that dentists as a whole, and the medical profession also, might become thoroughly familiar with them in order that many of the mistakes that are made along that line may be avoided. I have had cases sent to me by able physicians in which the diagnosis of syphilis was made from the malformation of the enamel of an incisor tooth, and which in my judgment had absolutely no relation to syphilis.

I want to say a word in reference to terminology. I object personally to the term erosion as applied to syphilitic lesions of the teeth. Somebody has called it erosion simply because it looks like erosion, but that is not a good reason, and the assumption that it is erosion is constantly misleading. Dr. Ferris has indicated that it is more properly classified with other malformations produced by interference with the dental follicle and its contents during development, and should therefore be classed as it is now in Europe, as a hypoplasia, not as Black classifies it, as atrophy. I object to the classification of it as atrophy, because atrophy implies something that has developed and gone backward again, but this is from non-development. Erosion, I hold, should be confined strictly to that thing which we know is erosion, namely, chemical destruction of a tooth by acid substances inside of the mouth.

Dr. MYERS (closing the discussion). I have done considerable reading along this line for a number of years, and have noticed a great many cases that I considered to be syphilitic. Therefore when asked to read a paper at this convention, I thought that there was no subject which I might bring before the society which would be more beneficial, from the dental standpoint, then the subject I wrote upon. Not that I profess to be thoroughly familiar with the subject or that I might tell you something that you did not

know, but I wished to induce every member of the dental profession to study this subject, so that when a syphilitic patient presents himself or herself for dental treatment you may recognize the disease at once, and thus avoid syphilitic infection. I do not want to infer that every condition of the tooth that presents the appearance of erosion, as I termed it, is the product of syphilis; there are many exanthematous diseases that can produce conditions similar to syphilitic erosion if the child has these diseases during the intra-follicular period of dentition.

I wish to thank the gentlemen who have taken part in the discussion for their kind remarks and for discussing the paper so elaborately.

The Secretary then presented a number of applicants for membership.

Motion was made and carried that the candidates for membership be elected by acclamation.

Dr. Walker moved that Dr. P. B. McCullough and Dr. H. C. Ferris be elected corresponding members of the society.

The motion was carried.

Motion was then made and carried to adjourn until the Thursday morning session.

THURSDAY—*Morning Session.*

The meeting was called to order by the president, Dr. Laubach, on Thursday morning, May 20th, at 10 o'clock.

The first order of business was the roll call by the financial secretary, Dr. Knox.

The Secretary reported a list of applications for membership which had been approved by the Board of Censors, which on motion were elected by one ballot.

The Secretary presented a communication from the National Dental Association with regard to a dental journal to be published by the association. Also a communication from Dr. Fickes of Pittsburg with regard to a general index of dental literature, and a communication from Dr. Brophy in regard to the Miller Memorial Fund.

Dr. Seip moved that an appropriation of one hundred dollars be made by the society to the Miller Memorial Fund.

The motion was carried.

The next order of business was the reading of a paper by Dr. P. B. McCULLOUGH, Philadelphia, Pa., entitled "Wherein Clinical Evidence is At Variance with Extension for Prevention."

[This paper was printed at page 1174 of the October issue of the COSMOS.]

Discussion.

Dr. J. G. LANE, Philadelphia. I certainly have to admire Dr. McCullough's fortitude and integrity of purpose in coming here with a paper bearing on this subject, and tending to oppose the generally accepted ideas and methods of extension for prevention. As the members of the Susquehanna Association are aggressive and progressive men, his paper is pretty much like the red rag waved in front of a bull.

On looking through the journals and seeing the cavity formations as shown there—in some cases these preparations are made in plaster teeth—the perfectly angular corners, the flat margins, the axial walls cut just so, the steps inserted here, there, and elsewhere, I have wondered whether the men who advocate that theory to the extreme limit are practicing it also to the same extreme. I very much doubt it. I certainly agree with Dr. McCullough to the extent that the present much accepted and pictured method of extension for prevention as we see it presented in the dental journals is certainly an extreme measure and carried absolutely beyond reason, certainly beyond all accepted mechanical principles. For example, we notice the angular corner as usually pictured, the flat base meeting the vertical wall as a preventive measure. I cannot understand why there would be any more assurance that caries is going to be extended at that point, or that it will be better prevented by cutting a sharp angle than by rounding the corner. As for the flat base being a means of retention, Dr. McCullough says instead that the filling when inserted and completed does not depend on the base for its support, that being only a part of the seat or anchorage and of the retentive feature of that filling. The flat base therefore usually means simply more

cutting—and to my mind, unnecessary cutting—in a place where it is not as necessary as is generally supposed. The angles as cut in these cavities certainly tend to weaken the tooth from a mechanical standpoint. So the question resolves itself into the plain mechanical principle which no one can dispute, namely, that a cavity with sharp internal angles is more susceptible to fracture than one which does not have such angles. In that particular the enamel is not unlike many other substances, and we see the same principle followed in the various arts and mechanics generally. For example, we sometimes see a window-pane with a crack extending a little distance from the edge, and it will require but little pressure to break it farther; but we often see such panes temporarily repaired by drilling a hole through the glass including the extreme end of the break, and thus supporting it so that instead of bringing the strain to bear upon one weak point, it is distributed over a larger area.

It is also true, as Dr. McCullough has said, that by following the theory of extension for prevention to the extreme, the pulp is more likely to become involved than when simple measures are used; in most cases an undue amount of cutting is required if we expect to follow out the theories as pictured in our dental journals. I am, however, not nearly so conservative in the retention of the pulp as I was a few years ago, for the reason, which Dr. McCullough has shown, that there is often enough irritation to cause the death of the pulp in a few years' time. My experience is that a dead tooth properly treated is no more undesirable than a live one.

There is only one point in which I disagree with Dr. McCullough completely, and that is—if I interpret his statement correctly—that the enamel margin at a right angle is stronger than any filling material at the same angle. I must disagree with that statement, because the enamel is friable, and likely to fracture in many places where some of our filling materials are not liable to do so. If a filling material that is malleable and susceptible to wear is placed

at right angles with the enamel margin, the filling material will wear and leave the enamel margin standing higher, thus making it liable to chip off little by little.

Dr. H. C. FERRIS, Brooklyn, N. Y. Dr. McCullough, as Dr. Lane said, showed courage in writing a paper opposing the theory of extension for prevention. Does extension prevent caries? Does the square formation of the seat of the cavity render the cavity easier of access for the proper malleting of gold in our filling work? These two questions stand foremost in this paper. In my experience extension does prevent caries, and also the square formation of the seat does assist me in the proper malleting of gold in the starting of my fillings. I have had a great deal of experience in both practices, and personal experience will have to count in this subject. The value of extension for prevention as against the possible irritation to the pulp is also appreciated through personal experience. I believe that the extension for prevention theory as outlined and carried to the extreme needs to be modified, but the square seat, as illustrated according to the theory of Dr. Black, is an aid in the starting of the filling and affords a perfect mechanical retention of the first third of the filling. On a curved seat such retention is fifty per cent. more difficult to control. Whether the irritation to the pulp or the liability to devitalization is greater than the value we gain from prevention of caries must be learned by experience, and in my experience I have saved many teeth from recurrence of caries by following the present accepted method. I believe that if the antiseptic care of the cavity after preparation is neglected, irritation of the pulp is greatly favored, leading to its final inflammation and devitalization. Frequently we prepare cavities, remove the brown stain, and apparently find firm seats, but microscopically these spots can be traced directly to the pulp, and if we do not render the cavity properly aseptic we cover up matter which will prove injurious later on. I have had very little trouble in my practice from devitalization due to extension for prevention. If I had found in the course of five years

an increase in that particular, I should have abandoned the method, but I do not find such irritations or devitalizations, nor do I have such marked difficulties as indicated by the essayist.

Dr. E. C. KIRK, Philadelphia. I want to say a few words in regard to this subject. I want first to do as all have done—express my great admiration for the courage of the essayist in coming here to make such a statement. I once heard of a minister who was preaching a test sermon in New Hampshire, and in giving a picture of heaven, he went on to describe it as a place where the streets were at right angles, all nicely paved, limitless rows of houses of pressed brick carefully laid, white shutters, white marble steps, and angels robed in spotless garments scrubbing the white marble steps throughout the countless ages of eternity. At this point one of the deacons turned to another member and said, "That minister must be from Philadelphia." And so, if I did not know Dr. McCullough, if he had been dropped among us from the clouds and nobody knew him, I should be perfectly certain that the man who read such a paper as he has read came from the eastern side of the Alleghanies, as it would not be safe to read such a paper on the western side of those mountains.

Now, I want to ask if anybody can tell me who it was that coined the phrase "extension for prevention"? Dr. Black did not do it, and I have been trying to find out who said that for the first time. The man who said extension for prevention said a very bad and misleading thing. Dr. Black is a more careful thinker than is implied in the utterance of a phrase of that sort. What he said was: "The margins of a cavity must be laid down upon areas of tooth structure relatively immune to attacks of caries-producing organisms in order to prevent recurrence of decay." The whole salvation of that axiom hangs on the fortunate introduction of the word "relatively"—"relatively immune"; but someone who thought that he had grasped the whole situation has said "extension for prevention," and that is misleading. I agree with the essayist that it should be restated in some-

thing like this form, "extension in the hope of prevention." It is an assumption, absolutely an assumption, that the tooth may re-decay, and the assumption is embodied or implied in such a careless phrase as to indicate that the failures in fillings that have occurred by recurrence of decay have occurred because the fillings were not extended enough. So we want to keep in mind always the original statement of Dr. Black, and not the idea that extension means prevention in any absolute sense, because the conclusion from that would be that the more tooth structure we cut away and replace with gold the better. If that be so, why not plate the whole tooth with gold? Then you will prevent decay, because gold will not decay. There are a whole lot of factors that should be taken into consideration and carefully studied in coming to such an important conclusion as to our right to mutilate teeth, and we do mutilate teeth when we cut out a piece and build it over with gold, even for the purpose of curing caries. The whole thing is preposterous in principle; there is no operation in the whole range of therapy more ridiculous than the attempt to cure the disease dental caries by hammering gold or any form of filling materials we have against the tooth substance. We must do better than that when we have learned what the cause of caries is.

I want to call attention to another matter, and that is, the question of the periodicity of decay. No man has shown more conclusively and more definitely than Dr. Black the fact that the causes of decay are external to the tooth itself. The essayist has also called attention to that, and shown, as we all know from practice and observation, that there are periods of susceptibility in the individual, and that certain individuals are more susceptible to caries than others; we have all had them. We have seen cases of people who have known nothing of oral hygiene, whose knowledge of the ordinary tooth-brush is a minus quantity—who do not even know how to spell the word; and yet their teeth do not decay. There are such cases. Therefore caries is not wholly a filth disease; it is something more. On the other hand, we have seen

patients whose mouths have been kept in the best possible shape by the dentist, whose efforts have been seconded by the patient, and yet whose teeth will decay and re-decay, and we know by the study of these cases that there is something in the problem that has not yet been solved. Personally, I believe the solution of the question will come through the kind of work that such men as Dr. Ferris and Dr. Michaels and others are doing along this line, for I believe that is where we must look for it. I want to add to this thought the other one that the nutritional question is mainly one of food habit. Miller has demonstrated conclusively that caries of the teeth may be produced by the fermentation of carbohydrate food through the agency of certain kinds of bacteria of the lactic-acid-producing group, and his demonstration was in conformity with Koch's postulates, so that we know that caries can be produced that way. Nevertheless we have the case of the individual where we see carbohydrate food clinging to the teeth continually, and where the teeth do not decay, and yet we have other individuals, who do not have food particles adhering to the teeth, because they are kept clean, and whose teeth do decay. In his investigations of the saliva Michaels refers to the fact that in the oral secretions as found in the mouths of caries susceptibles, those cases in which caries was running rampant, he invariably found a substance which reacts to the so-called v. Jaksch's reagent for carbohydrates of the maltose type. This substance Michaels designates as glycogen. I doubt if it is, but whatever it may be, it is a sugar-like substance found in the saliva of these susceptibles, and I believe that it is the natural pabulum for the bacteria that produce caries. While it is demonstrated that the carbohydrate food taken into the mouth can produce caries, I do not believe it is ordinarily produced in that way. What I do believe is that there is in the saliva of these susceptibles a pabulum the result of nutritional metabolism, that is the real food for the bacteria of caries. Therefore I regard caries of the teeth as an expres-

sion of the nutritional state, and believe that the nutritional state depends largely upon the food habit of the individual.

I can only say with reference to the mechanical aspect of this question that I am greatly in sympathy with the attitude of the essayist with regard to his criticism against the extreme mutilation of teeth—the unrighteous, unholy mutilation of teeth for the purpose of setting in gold blocks simply because it makes the cavities easier of access, so that the operation can be done more thoroughly. That is a question of skill. When I was doing more practice than now of a mechanical sort I was educated and trained in the older form of cavity preparation. I believe in extension in the hope of prevention, but I believe in cavity preparation along the lines laid down by Marshall Webb as the best type of cavity preparation, both artistically and therapeutically.

Dr. McCULLOUGH (closing the discussion). In the absence of pain or discoloration one is apt to assume that pulp function continues normally, but when, after ten or fifteen years, it is seen that in a given case only the filled teeth have become devitalized, then it is clear that pulp disturbance commencing with the cavity of decay—a histological fact—is speeded on the backward changes by the insertion of a thermal irritant. The extent of injury from this latter cause will be in proportion to the amount of extension and the consequent bulk of the filling. Too much virtue is attributed to the filling operation as a preservative and prophylactic measure. More gold fillings are successful because of the accident of the time at which they are inserted than because of the skill or understanding of the operator.

The work of Metchnikoff, Ehrlich, and Kirk—notably an essay on "The Predisposing Factor in Dental Caries," by the last-named—impels the self-evident conclusion that before research regarding the nutritional factor is complete, fundamentally essential as it is to the scientific filling, any attempt at a system of scientific cavity preparation is premature.

(To be continued.)

THE DENTAL COSMOS

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Devoted to the Interests of the Profession.

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PHILADELPHIA, DECEMBER 1909.

EDITORIAL DEPARTMENT.

THE ETIOLOGY OF DENTAL CARIES.

It seems to be a characteristic of all great truths that when first enunciated their illuminating effect in the dark places of ignorance is so great that we are temporarily blinded to the fact that their range of application is but partial, leaving larger areas still to be explored and illuminated.

When Miller published the results of his researches, in 1882 and thereafter, covering his studies of the causation of dental caries, and showed conclusively that tooth-decay results from bacterial infection by a class of micro-organisms having the power to split up certain carbohydrates into lactic acid, which acid was the decalcifying agent in the first stages of the carious process, the world of dentistry not only accepted these researches as conclusive, but jumped to the broad conclusion that the etiology of the carious process was explained—or otherwise expressed, that the cause of tooth-decay had been at last discovered. In a certain sense this conclusion was justifiable, but when we come to

realize the breadth of meaning which may be properly attached to the use of the word "cause," and when we consider that there are a large number of phenomena related to the causation of dental caries yet unexplained, it cannot even yet be claimed that we have in the full sense possessed ourselves of that comprehensive understanding of all of the factors involved in this complicated process of tooth-decay which would justify us in asserting that we have discovered its cause.

The whole question of susceptibility and immunity in connection with the carious process is still a sealed book. Only the outermost verge of that subject has been investigated, and we know little about it other than its most superficial features. The fact of immunity and the fact of susceptibility still offer problems for the investigator, and upon their solution will depend the next step in arriving at what may properly be termed the cause of tooth-decay.

In 1897 a step forward in the study of the causes of tooth-decay was made by the publication of the researches of J. Leon Williams in his studies of the pathology of enamel and in the discussion of these researches by G. V. Black, in which another important factor in the causation of decay was brought out, namely, the factor which leads to the localization of the destructive process upon certain surfaces of the tooth through the agency of what has been variously termed the bacterial plaque, or the gelatinous plaque, or the microbic plaque. The early investigations of G. V. Black in 1886 with reference to the power of certain mouth-bacteria to produce gelatinization of the media upon which they were grown seemed to add another item of truth which still further illuminated the obscurities of the general problem of the etiology of tooth-decay. The observations of J. Leon Williams tended to confirm Black's studies, and these were later confirmed by the studies of Kenneth W. Goadby of another mouth-organism having plaque-forming characteristics, the *Staphylococcus viscosus*, an organism having the property of producing a viscid mucinous excretion which under favorable conditions it was assumed might assist in localizing the lactic acid fermentative process upon protected or sheltered areas of tooth-structure, thus making it possible for decay to originate upon areas of tooth-structure which were without irregularities or faults

of formation, and explaining the formation of cavities upon smooth enamel surfaces.

Miller's researches foreshadowed the conclusion which has since been confirmed by other observers, that dental caries is essentially a factor of the environment of the teeth; that it is a condition which arises externally to the tooth and not internally; that whatever part in the process may be played by the tooth itself is a part which modifies the rate and character of the decay only. The enunciation of this conclusion has directed closer attention to the enviroing conditions of the teeth, and particularly to the composition of the mixed oral fluids constituting the saliva in which the teeth are constantly bathed.

J. P. Michaels has emphasized the fact that the saliva varies in its composition with the nutritional state of the individual—a fact which has been fully verified by numerous observers; so that the saliva can no longer be looked upon as it formerly was, as an indifferent fluid having a fairly uniform chemical composition, varying only occasionally in its percentage of solid substances and in its reaction.

Studies of the human saliva with reference to the etiology of dental caries have developed certain more or less constant features which we deem it of importance to here record. First, the saliva of caries susceptibles, those in whom the carious process is active, contains a larger proportion of mucin in solution than the saliva of immune individuals. The saliva of caries susceptibles also as a rule contains a carbohydrate substance regarded by Michaels as glycogen, which reacts as a brown precipitate with v. Jaksch's reagent, an iodo-potassium-iodid solution. As, however, a similar reaction occurs when the saliva contains products of hydrolysis of starch, the source and origin of the dissolved carbohydrates is yet to be ascertained. It is of importance that investigation of this question should be made, for if the origin of these dissolved carbohydrates found in the saliva of susceptibles has its origin in the processes of bodily nutrition, then the conditions which render the saliva fermentable by lactic-acid-producing organisms are constitutional in character, and the determination of that point will throw much light upon the question of susceptibility to caries of the teeth and do much to explain why it happens to be a fact that the tendency to tooth-decay or susceptibility to caries varies at

different periods of life. The composition of the saliva of the caries susceptible affords certain other data which tend to throw light upon the question of localization of decay and upon the formation of the bacterial plaque, which should be here noted.

It is taken for granted that the existence of the bacterial plaque has been demonstrated beyond reasonable dispute. It has also been demonstrated that decalcification of tooth-structure subjacent to the bacterial plaque takes place owing to the generation of acid by ferment germs within the plaque. The explanations which have been thus far given of the mode of formation of the bacterial plaque involve the co-operative functioning of an organism capable of producing a mucinous fermentation along with the bacteria whose function it is to ferment carbohydrates into lactic acid—a sort of symbiotic relationship which is hardly explainable with the data at hand, nor does such a relationship seem explainable merely upon the theory of accidental association of these two classes of organisms. In view of the known characteristics of the saliva of caries susceptibles it seems possible to explain the formation of the bacterial plaque by simpler and more direct means. It is known that the saliva of caries susceptibles is alkaline or neutral, as a rule; that the saliva is usually viscid or mucinous, because only an alkaline saliva can hold mucin in solution. Again, such a saliva containing also a fermentable carbohydrate and organisms capable of generating lactic acid, furnishes the conditions necessary to the production of a bacterial plaque; for the smallest addition of lactic acid to such a saliva immediately causes a precipitation of mucin within the sphere of contact of the acid with the mucin, which falls down as a glutinous mass and by condensation upon the surface of the tooth surrounds the mass of lactic-acid-producing germs, agglutinates them and fixes them in adhesive contact with the enamel.

While experimental study of this question as to the possibility of this mode of formation of the bacterial plaque is progressing, the suggestion as to its probability is here made for the reason that it offers a less complicated solution of the question, and one which appears to be more directly in accord with the observed factors involved, an explanation that is independent of the accidental relationship of a mucinous fermentation with the lactic acid fermentation, which has been the explanation heretofore offered.

A NEW JOURNAL.

ONE year after the foundation of the Odontological Society of Chile, this progressive young body announces itself to the outer world by a very creditable journal,* the purpose of which, as propounded in the introductory note of the editors, is not so much to bring new and original investigations as to offer useful extracts of valuable foreign literature, to which the greater portion of its pages is devoted. In spite of these modest pretensions the inaugural June issue contains a very commendable original communication on "Hyperesthesia of the Dentin," by Rafael Germain, the July issue an essay on "The Hygiene of the First Dentition," by the director, Dr. Luis de la Barra Lastarria, the August issue a paper on "The Use of the X Ray in Dentistry," by Carlos E. Bolton. A department of "Useful Hints," one of "Proceedings of the Odontologic Society of Chile," and one of "Questions and Answers" complete the make-up of this journal, which we wish a hearty God-speed.

The Truman Dinner.

ON the 22d of January 1910 a complimentary dinner will be given to Dr. JAMES TRUMAN, D.D.S., LL.D., at the Waldorf-Astoria Hotel, New York, by his professional friends, as an expression of their appreciation not only of his personal characteristics and worth, but of his many years of self-sacrificing labor as teacher, author, editor, and investigator, in the advancement of dental science and art.

It is the desire of the Committee having this banquet in charge that all of Dr. Truman's friends throughout the world shall utilize this opportunity to express their appreciation of Dr. Truman either by attending the banquet or by communicating their good wishes and congratulations to him on that occasion. Those who desire to attend the banquet can communicate with Dr. S. G. Perry, treasurer of the Committee, 130 West Fifty-seventh st., New York, and those who cannot attend and who desire to send letters or telegrams to be delivered to Dr. Truman may forward these in care of the Editor of the DENTAL COSMOS, corresponding secretary of the Banquet Committee.

As it is impossible for the Committee to individually reach all those who will wish to take part in this celebration, and as it is desired that none shall fail to receive notice of it, the Committee has decided to give notice in this manner through the various dental journals in the hope of reaching everyone who may in any way desire to participate.

* *Revista Dental, Publicacion Mensual, Órgano de la Sociedad Odontológica de Chile.* Director Luis de la Barra Lastarria, Santiago de Chile.

BIBLIOGRAPHICAL.

HANDBUCH DER PORZELLANFUELLUNGEN UND GOLDEINLAGEN. [MANUAL OF PORCELAIN FILLINGS AND GOLD INLAY.] By Dr. med. ERNST SMREKER, dentist, Vienna. I. Part: Das Fuellen der Zaehne mit Porzellan. [The Filling of Teeth with Porcelain.] Berlin: Berlinische Verlagsanstalt, 1909.

For some time the silicate cements and the gold inlay have put the porcelain inlay in the background of interest. The book before us represents one of the signs of the turning of the tide, and if these signs are not misleading, the porcelain inlay, after having profited from the technical experiences derived from the use of the gold inlay, will again occupy its place as the most artistic filling, though its limitations—arising from its comparatively small resistance to compressive strain—must not be overlooked.

In the first part of his work, which is comprised in the present volume on porcelain fillings, the author has carefully considered the voluminous literature of some 400 numbers, yet instead of critically disposing of this vast material and drawing his own conclusions therefrom, the author has permeated the description of his own preferred methods with critical and historical observations, thus leaving it to the reader to pick out the essential practical portions and to put to use the author's own valuable experiences.

After a brief consideration of the chemistry of porcelain and the historical development of the porcelain filling, the author takes up the technique of the porcelain inlay and the preparation of the cavity in different teeth, advocating as

a means of separation different progressive sizes of rubber strips, which do not irritate and lacerate the gingivæ. Special attention is paid to the taking of impressions, the burnishing of the matrix, and the removal of the model from the cavity, preference being given to the direct method. The advantages and disadvantages of the different impression materials are critically considered, and the investing of the matrix and the various investment materials available are described. One chapter treats on the most popular ceramic materials, and the low- and high-fusing porcelains are compared as to their relative merits, the author preferring low-fusing porcelain, which only slightly adheres to the matrix, and is not so liable to distortion. The color problem in porcelain is discussed at length; in the long list of authors cited we miss, however, the names of V. W. Gilbert and W. L. Fickes. Special chapters are devoted to the building-up of the porcelain on the matrix, the baking of high-fusing porcelain, electric furnaces, and the means of controlling the baking of the porcelain, the evil results of over-fusing, such as porosity, transparency, and loss of luster and color, the shrinking of the porcelain and means to prevent it. While speaking of the trying-in of the inlay, the author recommends undercuts, roughing and etching of the cavity surface of the inlay, which latter can be done with hydrofluoric acid. Next, the secure anchorage of inlays and incisal edges in incisors by means of platinum pins, and of porcelain veneers, the retentive form of inlays, inlay cements, and the principles guiding in their se-

lection, also the behavior of the cement line, are discussed. The advantages of the porcelain inlay over the gold filling are summed up as follows: Sufficient resistance to mechanical and chemical influences, watertight closure of the cavity, no alteration in volume, poor conductivity of heat, natural appearance, sharp contours, non-irritation of the pulp and gingivæ, easy removal of the filling if necessary, easy restoration for both patient and dentist, antiseptic quality, small sacrifice of tooth-structure, and general availability. The slightly limited durability as determining the indications or contra-indications for porcelain inlays in individual cases is discussed, and the special methods of Herbst, Moeser, Silberer, Parker, C. Fritzsche, Dall, Robin, and Guttman are specially described.

The rich illustrative material considerably adds to the practical value of this most diligent and conscientious work, and the shortcomings in the author's working method as mentioned above will, we hope, be eliminated in his forthcoming volume on gold inlays.

DAS METALLEINLAGE-VERFAHREN.
[METAL INLAYS.] By H. W. C. BOEDECKER, B.S., D.D.S., M.D., Praktischer Zahnarzt in Berlin. With 120 illustrations and 14 plates. Berlin: Hermann Meusser, 1909.

A book on this subject is to be warmly welcomed as a sort of beacon light in the restless sea of journalistic pro and contra literature which since the introduction of the Taggart cast inlay method in 1907 has swamped us, especially if such a book be of such a high standard as that of Dr. Boedecker. The very principle from which this author starts out recommends his work, namely: "Never make a single step in any practical work without knowing the theoretical reason." Moreover,

this is not a disguised advertisement of some infallible casting machine or some method with which the inlay must stand or fall, but an epitome of a conscientious practitioner's experiences with the methods designed by others, and of the modifications which under his hand have yielded the best results. Neither is the author a blind advocate of inlays under all conditions, but he adopts Franklin's liberal as well as sane motto: "A place for everything, and everything in its place!" After a brief historical review of the evolution of the inlay, the various steps in making inlays are taken up in individual chapters, of which we would only mention those on formation of the cavity and retention, caries and cavity formation, the enamel edge, the different methods of taking impressions, the various methods of casting, setting and finishing the inlay, the advantages and disadvantages for the teeth, the patient, and the operator. The illustrations, especially the beautifully plastic half-tones representing cavity preparations, serve to clearly demonstrate some of the main principles involved in inlay making, and those operators who have experienced failures in this field of work will undoubtedly take new courage from this inspiring book.

THE AMERICAN POCKET MEDICAL DICTIONARY. Edited by W. A. NEWMAN DORLAND, M.D. Sixth Revised Edition. Philadelphia and London: W. B. Saunders Co., 1909. Price \$1.00 net.

This small volume, the previous editions of which have been reviewed in the December issue 1903 and August 1907 of this journal, has again been brought up to date, even such comparatively very recent topics as opsonins, Bier's treatment, tricresol, pyocyanase, novocain, etc., hav-

ing been duly considered and explained. As a convenient aid for quick consultation this medico-dental dictionary will be welcomed in its revised edition by every practitioner and student of medico-dental science.

THE DENTAL DIRECTORY, 1909. Containing the Names and Addresses of All Registered Dental Practitioners, with Description and Date of Qualification, Practicing in the United Kingdom, the Colonies, and Abroad. Compiled from Official Sources. London: John Bale, Sons, & Danielson, Ltd. Price, 2s. 6d. net.

This present volume is intended to furnish a handy and easily accessible directory, which in a very practical and useful way contains first a topographical list, with the names, addresses, and qualifications of practitioners arranged under the towns in which they practice, also an alphabetical list. The useful information on the most important dento-legal acts, on dental hospitals and schools in the United Kingdom, on dental surgeons attached to the general hospitals in London, British dental societies, the curriculum leading to the degree of L.D.S., the abbreviations commonly used for degrees, and dental publications, British as well as American and foreign, renders this directory in pocket-book form a convenient cicerone which can give much valuable information.

ZAHNAERZTLICHER ADRESS-KALENDER FÜR DEN EUROPÄISCHEN KONTINENT, 1909. Part I—Germany. Berlin: Berlinische Verlagsanstalt.

The increasing proximity of international relationship of the dental profession is evinced by this directory, which,

like the British directory, offers an alphabetical and topographical list of the names and qualifications of German dentists, together with an enumeration of the medico-dental boards, dental university faculties, dental societies, and standard fees. The comparative statistics of the ratio of population and practicing dentists, which is far below that of the United States, throws an interesting side-light upon the estimation of dental service in Germany.

New Editions.

THE following books, which have formerly been reviewed in our columns, have appeared in new editions:

DENTAL MEDICINE. A Manual of Dental Materia Medica and Therapeutics. By FERDINAND J. S. GORGAS, A.M., M.D., D.D.S. Eighth Edition, revised and enlarged; 627 pages. Philadelphia: P. Blakiston's Son & Co., 1909. Price \$4.00 net.

A MANUAL OF THE INJURIES AND SURGICAL DISEASES OF THE FACE, MOUTH, AND JAWS. By JOHN SAYRE MARSHALL, M.D. (Syrac. Univ.). Third Edition, revised and enlarged; 717 pages, with 390 illustrations and 6 colored plates. Philadelphia: The S. S. White Dental Mfg. Company, 1909. Price \$5.50.

THE PRINCIPLES OF BACTERIOLOGY. A Practical Manual for Students and Physicians. By A. C. ABBOTT, M.D. Eighth Edition, thoroughly revised; 631 pages, with 100 illustrations, 26 of which are colored. Philadelphia and New York: Lea & Febiger, 1909. Cloth, \$2.75.

MANUAL OF CHEMISTRY. A Guide to Lectures and Laboratory Work for Beginners in Chemistry. A Text-book Specially Adapted for Students of Medicine, Pharmacy, and Dentistry. By W. SIMON, Ph.D., M.D., and DANIEL BASE, Ph.D. Ninth Edition, thoroughly revised; 716 pages, with 78 illustrations, one colored spectra plate, and 8 colored plates representing 64 chemical reactions. Philadelphia and New York: Lea & Febiger, 1909. Price \$3.00. net.

REVIEW OF CURRENT DENTAL LITERATURE.

[*La Revue de Stomatologie*, Paris, September 1909.]

PATHOGENESIS AND THERAPEUTICS OF THE AFFECTIONS OF THE BUCCAL MUCOSA IN GENERAL DISEASE. BY M. CRUET.

In a most elaborate article which was presented before the Stomatologic Section of the International Congress of Medicine at Budapest, August 1909, the author passes in review the following diseases which reflect pathologically upon the buccal mucosa:

<i>Intoxications</i>	{	Hydrargyris (Mercurial poisoning).			
		Phosphorism (Phosphorous poisoning).			
		Saturnism (Lead poisoning).			
		Alcoholism.			
<i>Infectious diseases</i>	{	{	Typhoid fever.	{	Scarlet fever.
			Grippe.		Measles.
			Eruptive fevers.		Smallpox.
			Diphtheria.		
			Erysipelas.		
		Venereal diseases.	{	Gonorrhea.	
Tuberculosis.	{	Syphilis.			
<i>Dystrophies and dyscrasias</i>	{	Diabetes.			
		Albuminuria and uremia.			
		Rheumatism.			
		Gout.			
		Chlorosis and anemia.			
		Scurvy.			
		Purpura.			
		Tabes.			
<i>Diatheses</i>	{	Arthritism.			
		Scrofulosis.			

portals of entrance for micro-organisms and infection.

(2) Even in the normal state the mouth is inhabited by numerous pathogenic or non-pathogenic micro-organisms, both of which may become more virulent and dangerous under certain conditions, especially in general disease.

(3) The pathologic manifestations of the buccal mucosa in general diseases are determined by the local infection or by pre-existing affections, such as simple stomatitis or pyorrhea alveolaris.

From this study on the pathogenesis of these diseases he arrives at the following conclusions, which are of particular interest in this era of prophylaxis:

(1) The mouth and the buccal mucosa, owing to their anatomic constitution, their environment, and their functions, are especially exposed to traumatism and excoriation—in short, to the production of various

(4) The seriousness of the infections of the buccal mucosa in general disease is always in direct proportion to the state of infection or previous pathology of the mouth, regardless of the disease.

(5) The disease, whether it be due to intoxication, general infection, or nutritional trouble, may, aside from the infection or the local lesion, play an important part in ex-

plaining the character of certain oral diseases and their seriousness.

(6) The two factors, however, *i.e.* general disease and local infection or lesion, must always be associated and taken into consideration for a rational explanation of the pathological manifestations of the buccal mucosa and their peculiarities in general disease. The necessary reciprocal influence of these two factors is variable according to the disease.

(7) The therapeutic results, either preventive or curative, show what preponderant influence the local infection exerts upon the production of various alterations of the buccal mucosa in general disease.

[Proceedings of the Royal Society of Medicine, London, May 1909.]

SOME EXPERIMENTS ON THE ACTION OF FORMALIN AND OTHER ROOT-DRESSINGS. BY DR. H. SIMMS.

The author reports a number of practical experiments on the action of various forms of root-canal dressings commonly used, and essays to explain how it is that the introduction of formalin has wrought such an improvement in root-canal treatment. The drugs have been compared according to their power of destroying microbes with which they are not in direct contact. Dressings were applied to the roots of extracted teeth and sealed in, and the teeth were dropped into bacteria cultures. The effect of the antiseptic dressings on the bacteria immediately around the apices of the teeth was watched. While there appeared to be a completely unretarded growth right up to the whole circumference of a tooth containing carbolic acid dressing, there appeared around the apical region of the tooth which contained a proprietary dressing containing formalin a clear area in which no growth had occurred. The germs that had been present in the culture had not been permitted to grow; on the contrary, they had been destroyed by the medicament sealed inside the root. Therefore something, obviously of a gaseous nature, must have passed through the apical foramen of that tooth. To preclude the possibility of some of the formalin paste having been pushed through the apical foramen, thus acting directly on the germs, the root-dressing was not placed more than half-way down the root-canal, but the result was

exactly the same. This leads to the conclusion that if infection has passed through the apex, one might go on pumping down carbolic acid indefinitely without reaching the cause of the trouble, hence the immense value of a formalin preparation which is able to reach a point otherwise inapproachable.

Among the essential oils, the oils of cloves, turpentine, eucalyptus, and also Black's 1 2 3 mixture, which consists of the oils of gaultheria and cassia and carbolic acid, were tested, but none of these showed any evidence of power to penetrate through the apex. Perchlorid of mercury in a 1 per cent. solution, iodoform, tincture of iodine, and hydrogen dioxid all gave negative results, although all these drugs had been subjected to repeated trials. A particularly careful series of trials was made with perhydrol, the drug in one case being sealed into a root just extracted and full of septic material, so that there was abundant matter present to set free the oxygen from the perhydrol; but although the interior of the root was favorably affected by the oxygen, no beneficial result was shown around the apex.

Equal parts of trieresol and formalin mixed, which is the formula suggested by Buckley, showed a little less penetration than pure formalin, which should not be used in the mouth, but the penetrating action was doubtless sufficient for the purposes required. The excellent results obtained by means of this combination of drugs is due more to the power of wide penetration than to the complicated system of chemical changes that Buckley himself seems to have faith in. Trieresol is a body very similar to carbolic acid, and as may be expected, a separate trial of the penetration of this drug alone merely confirmed still further the inefficiency of all liquid antiseptics for the purpose of treating dead teeth, and it becomes evident that it is only the formalin element in the Buckley combination that is responsible for the advantages gained by its use. Various combinations of other drugs with formalin were tried both clinically and in this experimental way, the results varying very little. An escape of the formalin vapor, not only at the apex but now and then at the other end of the root was noticed whenever the dressing had been sealed in with gutta-percha; subsequently every dressing was sealed in with cement.

From the foregoing it may be conclusively asserted that no matter how strong liquid antiseptics are, they have no efficiency beyond the apex of the root. Still further, it has been shown by the author that carbolic acid and oil of cinnamon will only destroy the comparatively small number of bacteria with which they are in absolutely direct contact, and are therefore not to be relied upon in the treatment of septic roots.

If the question arises what preparation of formalin is to be particularly recommended, it may be said that as long as a solution of formalin 1 part in either 3 or 4 is adhered to, it matters little what the formalin is diluted with. It happens, however, that very few liquids will mix with formalin, and so it follows that we are limited to either tricoresol, creasote, or glycerin.

Some small proportion of formalin incorporated in the permanent root-filling will help to preserve the root in a wholesome condition. The power of the formalin vapors to penetrate the dentinal tubes was also tested, and it was found that in case of a ground tooth strong formalin penetrated at least half through the dentin, which indicates that formalin preparations in strong solutions are not to be used, especially when the cavity approaches the pulp.

Considering on one hand the powerful influence and the good results of formalin in teeth, both septic and sensitive, and on the other the enormous number of new proprietary preparations being constantly brought before the profession, all of which are expensive and rely on nothing more or less than formalin, this investigation into the mode of action of this drug is heartily to be welcomed.

[*Oesterr.-Ungarische Vierteljahrsschrift fuer Zahnheilkunde*, Vienna, July 1909.]

EXPERIMENTAL INVESTIGATIONS INTO THE METHODS OF ROOT-CANAL FILLING, WITH SPECIAL CONSIDERATION OF PARAFFIN. BY DR. J. SZABÓ, BUDAPEST.

Miller, in his "*Lehrbuch der Konservieren der Zahnheilkunde*," Leipzig, 1898, demands the following partly indispensable, partly desirable qualities for a good root-canal filling: It must not undergo decomposition; it must have a permanent though ever so weak anti-

septic effect; it must allow of easy introduction, and must reach the apical foramen; it must not irritate the periosteum or the periapical tissue; it must not discolor the teeth; it must not be porous, otherwise it may absorb secretions which may putrefy; it must allow of easy removal. On the basis of these requirements the author has tested the various root-canal filling materials, with the following results:

(1) The cotton group is unsatisfactory, for this material may decompose; the disinfectant power of the drug absorbed in the cotton is only temporary, as the filling is not waterproof, and the disinfectant is soon washed out; it irritates the periosteum, for if the filling is good, the cotton penetrates through any wide foramen, and if the root-canal is very narrow, the cotton can hardly be introduced, thus allowing blood serum to enter through the foramen; lastly, it is porous and absorbs secretions.

(2) Cements, though mixed with antiseptics, have a doubtful disinfectant power which has not yet been proved by way of experiment. Although in a wet condition cement is antiseptic, owing to its strongly acid reaction, this antiseptic effect disappears on hardening. It is difficult to introduce cement: if the foramen is wide it easily penetrates and sets up inflammation; if the canal is very narrow it cannot be introduced. Moreover, cement is porous and apparently permits fluids to penetrate between the filling and the canal wall. It is also very difficult to remove.

(3) Gutta-percha fillings have no antiseptic effect. Impregnation with antiseptics has not yet been proved to produce lasting effects. Gutta-percha cannot be introduced in very narrow canals, and is liable to be forced through wide foramina. It is not waterproof, and although it can easily be removed, it is difficult to make a perfect filling over it.

(4) Permanently soft pastes, though they can be introduced and removed easily enough, have no permanently antiseptic power, as appears from clinical experience and the possibility of their being washed out. They may be mixed so that they irritate the periapical tissue but little, yet in wide foramina the result is poor. Paraffin, on the other hand, never decomposes, and if mixed with

disinfectants has a permanently antiseptic power. The filling of a root-canal, if it is at all possible, can easily be effected with paraffin, as it readily penetrates to the foramen. Toward living tissue paraffin is the most indifferent of all known root-canal fillings, and if forced through the foramen, does not produce any inflammation of the periapical tissue. It does not discolor the teeth, and is so free from porosity and so waterproof that through or on the side of the filling no fluid can enter. It also absolutely precludes the spread of infection. Dr. Szabó's claims seem to be substantiated by a series of beautiful lithographs realistically colored after nature.

[*Journal of the American Medical Association*, Chicago, July 24, 1909.]

THE VITALITY OF DENTAL ENAMEL.

BY DR. R. R. ANDREWS.

Interested in this subject by Dr. C. Francis Boedecker's (of Berlin) work on "Enamel of the Teeth" (*Dental Review*, April 1906) and some of his recently shown sections and photographs of enamel, and taking issue with some of Boedecker's statements, the author has followed the growth of the enamel through the various stages of the fetus. He does not believe that the cement substance between the enamel rods is a vital tissue, or that it has the same power of vitalization as have the fibers which are formed in the dentinal canals. There can be no question, to his mind, but that in the living tooth it is a partially calcified tissue, a transition tissue, which in old age becomes wholly calcified. It is a tissue so changed chemically that when it has had its lime taken from it by acid it cannot readily be further destroyed. It resembles in this, not wholly but somewhat, the sheath tissue of the dentinal canals, which is not a vitalizing tissue, because within the core of this sheath tissue we can see the vital fiber sending out its anastomosing branches through the sheath tissue to other vital offshoots from other canals. This sheath tissue is also a transition tissue, which becomes calcified into calcified matrix as age advances.

The scant vitality found in young enamel seems to be due to a very thin organic layer of dentin origin, between the dentin and en-

amel, called the interzonal layer, together with an ingrowth of some of the processes of the dentin-forming cells which have invaded the enamel substance prior to its calcification. In some instances the author has found these processes to have persisted in this invasion of the enamel substance so as to reach, or nearly reach, to the outer surface of the fully formed enamel. These invading dentinal processes are exceedingly irregular in their course, seldom following the line of the cement substance, but more often running in an oblique direction across the enamel rods.

In a thin section of the cusp of a human tooth we can count nearly forty of these invading dentin fibers. Where they pass into the substance of the enamel they seem to have become flattened and compressed like lamellæ by the force exerted by the rods of the enamel while they were calcifying.

[*L'Odontologie*, Paris, August 15, 1909.]

A CASE OF SPONTANEOUS ORTHODONTIA. BY DR. FRANCIS JEAN.

The patient, a girl of five years of age, presented a gap between the anterior teeth, that had developed gradually, and resembled prognathism of the maxilla. On closer examination a very marked anteversion of the four upper incisors was observed, which elevated the lip in a very ugly form. There was also a retroversion of the four lower incisors, producing a space between the two arches wide enough to allow the passage of the little finger. The occlusion of the molars was normal. None of the divers causes for this anomaly, such as adenoids, polypi, or troubles in respiration were present, the child breathing freely through the nose, not snoring during sleep, and enjoying excellent general health. It was therefore suspected that the anomaly was simply the consequence of the habit of thumb-sucking. The mother had indeed permitted the child's habit, being ignorant of its dangerous consequence. After deciding to postpone orthodontic interference until the eruption of the permanent set, the mother was advised to break the child of her habit as soon and as radically as possible, and to present the patient after a few months. Two years afterward the child was brought back, completely cured of her habit, although

it had taken her several months to entirely break herself thereof. Surprisingly enough no sign of protrusion of the anterior part of the maxilla was left, and the direction of the lower incisors and the occlusion were normal. A comparison of the two plaster models made of the case at both visits leads the author to conclude that in a good many cases it would be advantageous to delay treatment and spare the children the discomforts of a regulating appliance; that often the various methods of regulation simply hasten what nature itself would spontaneously correct; that especially in the case cited, an appliance would have done little more than corrected the bad habit; and finally, that sometimes, if not often, we are inclined to pride ourselves on orthodontic results which are in all probability mainly due to the restorative efforts of nature.

[*Revue Trimestrielle Suisse d'Odontologie*, Zurich, No. 2, 1909.]

THE VALUE OF IDENTIFICATION BY
THE DENTAL EXPERT. BY DR. O.
AMOËDO.

The practice of legal medicine presents few cases where greater caution is required than those of establishment of identity. This is especially the case if the medico-legal expert is confronted with a corpse disfigured by time, with incomplete fragments of a skeleton, or with charred remains.

Among the aids to which he may resort in cases where the identification presents real difficulties, dentistry is undoubtedly one of the most important. The treatises on legal medicine mention, to be sure, the proofs which dentition may furnish in regard to age, also various peculiarities of the dental organs which may be utilized by the medico-legal expert. This is, however, not sufficient today; these statements must be made by a dental expert. In a number of cases in the past the identification could have been made by dentists owing to the means at their command. Legal medicine has not sufficiently availed itself of the aid which dentistry offered.

In a great many cases the teeth are the only practical means for establishing an identity. The conflagrations of the Ring-theater at Vienna, of the Opéra Comique at Paris, of the Charity Bazaar at Paris, the

cases of the Marquis de Morès, of the Imperial Prince, and of a corpse recently found in the burned ruins of the German embassy at Chile, and many others, have proved this sufficiently. But although dentists have occasionally been called upon by the legal authorities as expert witnesses, often their services have been sought too late, and frequently not at all.

Thompson* remarks that many very tedious and expensive lawsuits might have been avoided had the services of a dental expert been engaged. He cites the famous Hillman case, which was pending for over fifteen years before various courts in the eastern section of the United States, and in which finally a cast showed that while the teeth of the suspected corpse were perfect and regular, those of the real Hillman were irregular and defective. In this case the corpse was so disfigured that all hope of identification had been abandoned. If an examination of the teeth had been made at the beginning, all the trouble could have been avoided.

Another famous case was that of Goss-Udderzook, which also occurred in the United States,† and in which the life insurance companies would have been cleverly swindled out of large sums of money, had it not been for the testimony of identity established by a dental expert.

Dr. Amoëdo also recalls the case of the catastrophe at the Charity Bazaar in Paris. A body was recognized as that of Madame Hausmann and was removed by the family. After the usual ceremonies had taken place, it became clear that an error had been made. This mistake could have been avoided if the victim's dentist had been first consulted.

Another case is cited, in which a high official of the German embassy at Santiago, Chile, after having committed serious frauds, murdered the janitor and set the embassy on fire in order to create the impression that he himself had been buried in the burning ruins accidentally. He was apprehended some time after the charred body of the murdered janitor had been identified by a dentist. He confessed his ghastly crime in the face of

* A. H. Thompson, "Identification by Means of the Teeth," *DENTAL COSMOS*, 1897, vol. xxxix, p. 227.

† O. Amoëdo, "L'Art Dentaire en Médecine légale," p. 487.

overwhelming evidence, although he had fractured his victim's jaw and had partly decalcified his teeth with a blowpipe in order to preclude all possibility of identification.

Numerous other cases could be cited in which the data furnished by dentists have been successfully utilized. In a number of cases the dental examinations gave a negative result which is no less important. Thus in the case of Louis XVIII, the dental examination which the author made in co-operation with Drs. Magitot and Poirier made it possible to determine that the remains in St. Marguerite's cemetery belonged to an individual much older than the Dauphin.

In Spain, Dr. Otaola of Bilbao was able to prove the erroneousness of a charge of murder by demonstrating that a skull found in a sewer was not that of a woman who had disappeared. The alveoli of the teeth which were missing in the skull found were gaping, which would not have been the case if the woman had lost these two teeth some time previous to her death. Some time later the missing woman was found living in Buenos Aires.

The importance of the dental expert's services in establishing identity can at the present time no longer be doubted. In the future, dentists will be called upon in difficult cases not merely by chance, but from the very beginning of proceedings. It is to be hoped that in doing so the examination of the medico-legal expert will be indorsed by the dental expert, thus avoiding unjust and disagreeable mistakes.

[*Giornale di Corrispondenza pei Dentisti*, Milan, August 1909.]

INSTRUMENTS OF TANTALUM. BY DR. G. FASOLI.

The new silicate cements require instruments which absolutely resist the attacks of chemical substances. The use of spatulas of iridio-platinum, or of gold, pure or alloyed, leave a brown stain on such fillings, for which reason bone and agate spatulas have been introduced. These instruments, however, prove too large for very small plastic fillings, and therefore do not permit of the correct introduction of the cement into the small cavities, nor of the proper condensation. Two instruments are especially necessary for good

plastic fillings of ordinary or silicate cement, a small ball-shaped burnisher with which the material may be condensed against the points of retention, and a strong small spatula which is lubricated with cocoa butter, not vaselin, for shaping the contour, condensing the surface of the filling, and modeling the filling in the interdental spaces. Tantalum instruments fulfil all these requirements most perfectly. They have a smooth surface, do not discolor the cement, and can easily be washed, sterilized, and polished. Their price is rather high, but as they last indefinitely they prove to be a saving in the end. The author enforces his statements by citing some interesting data concerning the properties of tantalum.

[*Deutsche Monatsschrift fuer Zahnheilkunde*, Berlin, August 1909.]

ON THE AVERAGE TIME OF ERUPTION OF THE PERMANENT TEETH IN MAN. BY DR. C. RÖSE.

Again Röse has presented us with one of those investigations whose painstaking thoroughness is nothing short of marvelous. It is a common experience that the simplest scientific facts are most difficult to establish with absolute correctness. One might presume that the normal time of eruption of the permanent teeth is known in its most minute details. Yet the books on anatomy and physiology contain only very incomplete data. Judging from the heretofore best statistics compiled by Cartwright, Jr. (*British Journal of Dental Science*, 1857) and Dietlein (*Oesterreichisch-Ungarische Vierteljahrsschrift fuer Zahnheilkunde*, 1895), it is quite evident that the time of eruption of the permanent teeth varies within very wide limits. Röse has now himself compiled statistics comprising over 40,000 school children of both sexes, in different countries, in rural and city districts, in schools attended by the children of the working, middle, and leisure classes. The results show that the time of eruption varies widely, the limits of variation being smallest in the first permanent molars, largest in canines and bicuspsids. In the female sex the average eruption occurs four and one-half months earlier on an average than in the male. The difference is smallest in the eruption of the first permanent molars, largest in the ca-

nines. The extraordinarily early eruption of the permanent set in the Swedish children is probably due to the prevalence of the macropanencephalous Germanic race in that northern country. In children of the well-to-do classes the eruption occurs earlier than in children of poorer classes, in children living in cities earlier than in those from rural districts. This phenomenon is partly due to better nutritional conditions, partly to the greater fixity of racial traits. Rhachitis retards the eruption of the permanent teeth but

little. From these conclusions of Dr. Röse it would seem desirable that every dentist should compile his own statistics, which would give him the average time of eruption of the teeth of his patients according to the climatic, racial, and social conditions of his *clientèle*. We reproduce one of the eighteen of Dr. Röse's tables, which gives the average time of eruption of the permanent teeth in 41,021 school children in Germany, Sweden, Denmark, Holland, Belgium, Bohemia, and Switzerland:

		BOYS (21,139).				GIRLS (19,882).					
		Average time of eruption.		Variation in time of eruption.		Average time of eruption.		Girls' earlier average time of eruption.		Variation in time of eruption.	
		yrs.	mos.	yrs.	yrs.	yrs.	mos.			yrs.	yrs.
Maxilla.	Incisors	7	8	5½	to 11½	7	5	— 3 mos.		5½	to 11
	Laterals	8	11	6	“ ?	8	6	— 5 “		6	“ ?
	Canines	12	2	7½	“ 15	11	7	— 7 “		7	“ 15
	First bicuspid	10	5	6½	“ 14½	10	1	— 4 “		6½	“ 14½
	Second bicuspid	11	4	6½	“ 15	11	1	— 3 “		7	“ 15
	First molars	6	7	5	“ 9½	6	6	— 1 “		5	“ 10
Mandible.	Second molars	12	9	9	“ 15	12	5	— 4 “		9	“ 15
	Incisors	6	10	5	“ 10	6	7	— 3 “		5	“ 11
	Laterals	7	11	6	“ 12	7	7	— 4 “		6	“ 12
	Canines	11	2	7	“ 15	10	3	— 11 “		7	“ 14
	First bicuspid	11	3	7	“ 14½	10	8	— 7 “		7	“ 14½
	Second bicuspid	12	0	7	“ 15	11	7	— 5 “		7	“ 15
		6	5	5	“ 10	6	3	— 2 “		5	“ 9
		12	3	9	“ 15	11	9	— 6 “		8	“ 15
Average of the 14 periods .		9	10	. . .		9	5.4	— 4.6 “		. . .	

PERISCOPE.

Root-Canal Treatment in Badly Decayed Crowns.—In every dentist's experience a case often presents where a crown, although badly broken down, might be saved by immediate filling, but as the roots require treatment, immediate filling is impossible. During treatment, however, the tooth is subjected to further fracture and possibly to splitting of the roots.

The following suggestion is offered to overcome this danger: Insert a platinum or gold tube in the tooth leading to the root-canal and build the permanent filling around this at the first treatment, leaving the tube open for access to the root. After the treatment of the root is completed, the tube may be filled at the convenience of the operator.—S. S. CARLETON, *Dental Digest*.

Crown with Cast Base.—This crown is made by selecting a diatoric incisor of proper size and color. The holes for rubber are filled with porcelain and baked. Grooves are then cut on both sides, forming a dovetail back with greatest width at the cutting edge. The root is prepared in the usual way; a dowel of sticky wax that has been oiled and chalked is pressed in and adapted so as to perfectly fit the root-canal, projecting out one-fourth of an inch. This projection is softened by heat, and the facing, which has previously been coated with a film of chalk, is pressed into this soft wax, chilled, and both are removed together. The superfluous wax is trimmed off, the crown and wax dowel are refitted to insure perfect adaptation, and then removed and mounted on a sprue, the end of which should be concentric, to fit the wax post.—F. H. NIES, *Items of Interest*.

Oxyphosphate of Copper in Resorption of the Alveolar Process.—The frequent occurrence of resorption of the alveolar process between the roots of molars, both upper and lower, results in a condition which is difficult to treat satisfactorily. Aside from the lack of support, an open pocket is continually present, which offers lodgment to foreign substances that become septic, aggravating the condition and producing a subacute state of inflammation. The writer has found that the introduction of oxyphosphate of copper cement, completely filling this space, will improve the support of the tooth, keep out foreign matter, and overcome the irritation of the soft tissues. Resorption is sometimes due to the puncture of the floor of the pulp-chamber at the junction of the bifurcation of the roots; in such cases this mode of treatment gives gratifying results. A celluloid cement tube will be found very useful for introducing the cement. Owing to the therapeutic action of the oxid of copper, the soft tissues take kindly to it, and a remedial agent is thus kept in constant contact with them.—*Dental Practice*.

Gold Inlay as Bridge Abutment in Molar or Bicuspid.—If a molar, upper or lower, which is to be used as a bridge abutment is badly decayed—especially if the cavity runs down on the anterior surface or is deep enough to permit of its being cut out on this side—the procedure is simple, and it is not always necessary to devitalize the pulp. If, however, we cannot make a large enough cavity without devitalizing, or if the bridge is so large that we must have a very strong support, the pulp should be devitalized to permit of the passing of a post into the root.

Prepare a cavity without undercuts, running deeply into the tooth and down on the anterior surface well toward the gum line, all walls having good, solid, square edges. Into this cavity burnish a piece of platinum or gold platinum foil, letting it run over the edges. If a post is to be inserted into the root, it can be forced through the foil, removed, and soldered. Replace and reburnish this, and place in the cup a piece of rather hard Stent's, so that it will hold the sides of the cup well in place; invest in plaster and sand, and fill out with 22-k. plate gold. Again replace it in the tooth, and while firmly holding it finish off exactly as one would a gold filling. When finished we have an abutment that is as strong as it can be made, looks no worse than would an ordinary gold filling, and leaves nothing that would prevent cleaning as in a perfectly healthy tooth. Such an inlay can support one tooth as well as a cap, and as an abutment for a large bridge it is incomparable.—P. R. CHANCE, Paris, *Dental Forum*.

Making the Rugæ on Vulcanite Plates.—After trying in, cut the palate out of the wax form, leave the teeth as placed on the model with wax blocks, and slope the blocks to prevent undercuts.

Then invest the case in one half of the flask in the usual way, trim up the plaster of Paris, and when it is set dip a camel-hair brush in oil (I have found colza oil the best) lubricate the plaster to effect separation, and be particularly careful to see that the plaster palate is well painted with the oil.

Carefully tap the plaster in the other half of the flask, and avoid air-bubbles in the palate. When the plaster is hard, separate without heating up.

Then well soften a piece of wax of medium thickness and place it in the palate. Put the top of the flask over this and screw up in the press until the space between the two halves of the flask represents the desired thickness of the finished denture.

When the flask is separated, the rugæ will be disclosed on the wax plate. Trim off the surplus wax and run the plate on the model. Tap out the top half of the flask with a wooden mallet (this will be more easily effected if the inside of this half of the flask is previously soaped or well greased), then carefully run in plaster over the rugæ on the wax plate and put the top on the flask again. When the plaster hardens, separate the flask, boil out the wax, and proceed to pack.

If necessary, a polishing plate of very thin tin can be pressed up before the palate is made, but plates can be made without this

tin polishing plate, provided a good plug is obtained.

The advantages of this method are—(1) No expensive swager is necessary; (2) any thickness of wax can be used; (3) no metal casting need be done; (4) less time is wasted than by any other method, and, in addition, numerous other advantages which are too obvious to need recounting.—G. H. WARNER, *Ash's Quarterly Review*.

Fetid Breath and Its Causes.—Dental caries produces an evil odor from the mouth, but it is by no means the only cause. The diagnosis is not always simple. There may be cheesy degeneration in a crypt of the tonsils, which must then be removed. Certain forms of bronchitis also produce fetid breath, and the effect of digestive troubles in this respect is well known. In this case the evil odor does not emanate directly from the stomach; often it is due to the elimination by the respiratory mucosa of volatile products from the digestive tube. The same phenomenon takes place when the breath assumes the garlic-like odor after hypodermic injections of cacodylate. A disagreeable odor is often noticed in lymphatic patients of bloated appearance with retardation of nutrition. A sojourn at the seaside, which stimulates metabolism, often produces a cure. The same is noted in children working in factories or close schoolrooms with defective nutrition and poor metabolism. Fetid breath must not be confused with ozena, *i.e.* fetid odor from the nose which is typical in atrophic rhinitis.—LE GENDRE, *L'Union Pharmaceutique*.

Extirpation of Pulp in Abutments.—The conservation of a pulp is desirable under some circumstances, and yet it is a grave question whether we are justified at times in sacrificing the proper fit of the crown and subjecting the patient to the intense torture of dressing down a live tooth to its proper proportions for the sake of keeping alive a pulp the period of whose vital importance and even usefulness is, perchance, a story of the past, and when, to cap the climax, in the end we shall have completed a doubtful operation.

With present-day methods of extirpation at the command of the operator, with almost certain asepsis at his beck and call, it is a more advisable procedure to extirpate the pulp in the tooth to be crowned before it is dressed down, instead of leaving an area of injured hypersensitive dentin exposed to the lasting action of the cement acid, thus at times setting up an irritation at the periph-

eral ends of the dentinal fibrils, which may and often does cause the death of the pulp, and brings in its wake all the evils which are the sequelæ of dead and disintegrating organic matter. Then, too, conditions arise which make the extirpation of the pulp in the tooth to be crowned imperative for the conservation of the tooth. Who has not in his practice been called upon to treat and utilize for abutment purposes a tooth which, standing alone, has become tender and irritated, though no caries be present; and who will dispute the fact that this aching member became the better for the extirpation of the pulp, the more comfortable for the patient and the safer as an abutment? What really took place here after the extirpation of the pulp was a deflection of the blood current from the pulp to the cementum and pericemental membrane, causing an increase in blood supply, and consequently an increase in the amount of vital resistance to destructive forces usually attacking the teeth. Thus by what is erroneously called "killing the tooth," you have saved it for the patient, which, though a little paradoxical, is nevertheless true.—HERMAN E. S. CHAYES, *Items of Interest*.

Canker Sores.—The ulcers generally known as canker sores are among the more common pathological conditions of the mouth, if we except the diseases dependent upon the teeth. These ulcers are generally single, though occasionally there may be two or more at the same time. They seem to appear suddenly and are quite persistent unless given suitable treatment. Their site is most commonly at the duplicature of the mucosa of the cheek and the gums, though they are occasionally seen on the floor of the mouth and on the edges and under the surface of the tongue. They vary in size from a grain of wheat to a small-sized bean. In shape they are somewhat lenticular or oval. Their depth varies, but can never be considered superficial. Their margins are rather well defined, but not so markedly as are chancreous ulcers of similar tissues, neither are they so irregular as are lupous ulcers of the mouth. The mucosa for a quarter to a half inch from the ulcer is of a deep red color. The base of the ulcer is overlaid with a grayish white necrotic covering, not unlike that found in syphilitic ulcers in the mouth. When this coating is removed, a granulating surface is exposed, which is extremely sensitive to touch, yet bleeds but slightly, if at all. The lymphatics doing police duty over the area involved do not, as far as my observation goes, become involved. These ulcers are so distinctive in their ap-

pearance that they can hardly be mistaken for any other lesion.

As to the nature and etiology of canker sores, there has been, and still is, some difference of opinion. Pusey and other prominent dermatologists believe them to arise from trophic disturbances, and class them under the head of herpes simplex. That herpetic ulcers of the mouth are in some way associated with gastro-intestinal disturbances there seems little doubt, since they seem to accompany or follow gastric attacks in persons predisposed to herpes. Slight trauma may be the exciting cause.

Local treatment of herpetic ulcers of the mouth is generally curative. If they are touched with silver nitrate, they respond quickly. If the ulcer is cleansed with hydrogen dioxid, then dried, and a twenty per cent. solution of zinc chlorid applied, a cure usually follows one application.—TH. L. GILMER, *Dental Review*.

Principles in Cutting Enamel.—The structural elements of an enamel wall must be arranged in certain ways in order to warrant strength, just like the bricks or stones and mortar in a mason's wall. The principles of arrangement can be definitely and clearly stated:

(1) The enamel plate must be supported upon sound dentin. If it is not, all the enamel projecting beyond the line of the dentin support is sustained only by the cementing substance between the rods, and force upon this piece will easily crack the enamel through on the lines of the cementing substance. No substitute can be made to give the same elastic support as the sound dentin. Moreover, the enamel itself in such positions has been weakened by the solution of cementing substances from between the rods extending from the dento-enamel junction outward.

(2) The rods which form the cavo-surface angle must run uninterruptedly to the dentin. The first condition may be fulfilled and not the second. If the enamel beyond the line of the last rods which rest on the dentin is unsupported, and is held together only by the cementing substance, though this may be perfect, it is not strong enough to sustain any force directed against its surface, especially the force required to condense gold against it.

(3) The rods which form the cavo-surface angle must be supported by a portion of sound enamel, the inner ends of whose rods are supported by sound dentin and the outer abutting on the cavity wall, all supporting the marginal rods like a buttress. This is the secret of strong enamel margins. The

rods which form the margin of a cavity at the surface should extend to the dentin, and be supported by a triangular portion of enamel in which the inner ends of the rods rest on the dentin. Then the outer ends may be covered by a filling material, and will support the marginal rods against all forces brought to bear on the surface. Reasonable force can be applied against such a wall without any danger of injury.

(4) The cavo-surface angle must be so trimmed as to avoid danger of crumbling the angle. There are two reasons for beveling the cavo-surface angle, but first it may be considered simply as a means of avoiding the sharp angle.

The four structural conditions just stated must be considered as the principles which underlie the formation of strong enamel walls and margins. It must be remembered that they are principles. They cannot always be perfectly attained, but, in proportion as they are carried out the walls are strong and permanent, and as we learn to observe them in the preparation of cavities we find that we more and more often recognize that failures that have occurred in our own work and in that of others have been caused by failure to attain these conditions.—F. B. NOYES, *Items of Interest*.

Method of Producing Perfect Margins in Cast Gold Inlays.—Instead of carefully trimming down all overhanging edges, leave a little surplus over all margins, and after setting the inlay and allowing the cement to harden for fifteen or thirty minutes, trim down the edges with gold finishing burs and by repeated burnishing. In doing this care must always be taken that the bur rotates from the gold toward the margin. In finishing an occlusal filling in a lower right molar, for instance, the labial margin is trimmed by running the engine in the regular way from left to right, but when working on the lingual margin the motor is reversed. Do not forget to lubricate burs and burnishers with vaselin. By these means the margins are perfectly closed, as far as can be determined by ocular and exploratory inspection. This sealing of the margins is necessary according to our past experience with cements of the consistence used in setting the inlays, which is the same as has been employed for several decades for setting crowns and bridges. I have removed very few crowns that did not greet me with that foul odor that cement stores up in its pores, and I have more often than not seen decay recurring under even well-mixed cement fillings. The thinner the cement the more easily it is washed out, and

cracks form that invite decay. In cases where the shrinkage and warping of the filling would be too great to be overcome by burnishing, a different technique is employed. The gingival margin is always the weakest part of a filling, showing the greatest percentage of recurrence of decay, and it is also the vulnerable point of inlays. As in most cases it is impossible to properly burnish gold to place between teeth, I help myself by beveling, giving the edge an angle of about 120°. The corresponding gingival margin of the inlay will show a V-shaped form, the outer edge of which I burnish inward, depending on the malleting to open it sufficiently to make it fit snugly. If, upon examination, I find any opening, I repeat and only after being certain of a perfect fit will I cement the inlay into place.—C. KABELL, *Items of Interest*.

A Modification of the Open-Face Crown.

—The objection to the showing of gold in the front of the mouth has led to the idea of the open-face crown. Its fitting to a central incisor or canine is a task that often means a merciless use of the grinding-wheel, with a running accompaniment from the patient of—"You're taking away all my enamel, I shall have no tooth left;" and when the grinding is completed, the central looks like a lateral, and the canine like a peg-shaped supernumerary tooth. Without this grinding the crown will, however, not fit at the neck of the tooth, and the gum will always bear evidence of irritation. In a case that refused to yield to ordinary treatment I tried leaving the small gold band that runs across the front of the tooth unattached on one side, and so arranged the loose end that it could be screwed tightly to the backing, the artificial tooth being cemented into place after the appliance was tightly in the mouth. The outcome of this was that very little grinding of the tooth was necessary. Also, when two crowns were used as supports, the absolute parallelism of the two was not essential. In doing this work I trim the teeth sufficiently to allow the thickness of the gold to go between and also relieve the bite so as to secure space for the gold. I then take plaster impressions of the teeth to be crowned, using little wax cups or half-cups that are taken away when the plaster has set. A separate model is taken of each tooth to be crowned. On these models the crowns are then made in two pieces, back and front, and these are adjusted at a subsequent

sitting to the teeth in the mouth. They are then wired tightly to the teeth, and a plaster impression is taken with them in place. This indicates their exact position, and the case can be finished in the workroom. The porcelain teeth are ground and adjusted to place, and a small box is made of thin platinum that exactly fits over the two pins of the tooth. Under this box a platinum tube is soldered, which is tapped with a screw-thread. To the one end of the labial half of the crown a flange of gold plate is soldered, which is pierced by a hole to accommodate the thread of the screw. These separate parts are assembled together and the incisal edge is built up with wax, and afterward cast in gold. The cast is soldered to the posterior half of the crown or crowns, and the last step consists in soldering the halves of the crown together on the opposite side of the screw. The bridge can then be fitted in the mouth with gutta-percha, screwed tightly, and the teeth cemented in and varnished.—J. H. MOORE, *Dental Review*.

Cast Gold Crown.—For contact, contour, occlusion, and perfect relation to the root and gums, the gold crown made by the following method comes near the ideal for posterior teeth: Prepare the root along the accepted lines, construct a gold band of 22-k., 30-gage plate and accurately adjust it to the root and gingival border, paying no attention to contour, as that will be taken care of later. Obtain a bite of the occluding teeth in wax and an impression of the band and teeth mesially and distally in plaster. Remove the band and place it in the impression. Make models and mount them on an anatomical articulator, oil all plaster adjacent to the band, place warm casting wax in the band and close the articulator, giving it a lateral motion as in mastication, so as to produce a correct occlusion, and carve. With a camel's-hair brush paint melted wax on the exterior of the band and carve the contact points and contour. Remove band and wax from the model, invest and cast, and when finished it will be found as near anatomically correct as any crown which has so far been made. Its one great advantage lies in the fact that by not contouring the band we do not take the risk of disturbing its relation to the root, the perfection of which is the cardinal point in the construction of any crown—the health of the surrounding tissues, and the life of the operation depending almost wholly upon it.—E. T. TINKER, *Dental Summary*.

OBITUARY.

ALGERNON KNOX JOHNSTON.

DIED, at Bloomfield, N. J., October 3, 1909, of heart failure, ALGERNON KNOX JOHNSTON, who was for more than a third of a century prominently identified with the manufacture of dentists' supplies.

Mr. Johnston, who was in his seventy-third year, had been in good health until the day of his death, and there was no premonition of approaching dissolution at the time he left his home in Stapleton, S. I., to visit relatives in New Jersey. Stricken while walking and conversing with his wife and friends, he died before a physician could be summoned.

The funeral services, which were held at the residence of his daughter in Stapleton, were attended by many of the most prominent citizens of Staten Island. Interment was made in the family plot at Middletown, Conn.

Algernon Knox Johnston, the eldest son of the late Prof. John Johnston, LL.D., of Wesleyan University, and N. Maria (Hamilton) Johnston, was born at Blandford, Mass., April 19, 1837. He attended private schools and the Middletown (Conn.) high school, and was graduated from Wesleyan in 1857. For some years he taught school at various points, including Haddam, Conn., and Plattville, Wis., and spent a year in Michigan University as an instructor in chemistry, studying medicine at the time. In 1861 he invented a waterproof cartridge, said to have been the first of its kind, which was largely used by the government during the Civil War. At the close of the war he closed up his factory in New York, because of the dangerous character of the business and his unwillingness for employes of his to incur danger when the need for it was over, and returned to the West. He became president of the Bellevue Zinc Works in Mineral Point, Wis., and was a large producer of zinc and zinc oxid.

In 1869 he began his connection with the dental profession, when with his three brothers he formed the firm of Johnston Brothers, of New York, manufacturers of dentists' sup-

plies. This firm was notably enterprising, and to their energy the dental profession was indebted for the production of the first dental engine—the Morrison, the Morrison and Wilkerson chairs, and the cone-socket handle system for dental instruments. They were also the first in this country to place the manufacture of nitrous oxid on a commercial basis. In 1874 the firm began the publication of *Johnston's Dental Miscellany*, which was ably edited by Mr. Johnston during the eight years of its existence. In 1881 the business of Johnston Brothers was merged with that of the late Dr. Samuel S. White in the formation of The S. S. White Dental Manufacturing Co. Mr. Johnston became a director of the new company, serving continuously until his retirement from active business in 1906. During the greater part of this period he was actively engaged in the manufacturing operations of the company, accomplishing also on occasion important special services. Among these may be noted two visits of investigation to the platinum-producing territory of the United States of Colombia, in search of new sources of supply.

Mr. Johnston was a man of broad views and wide reading, deeply interested in progress and culture, and active in their stimulation. He was a member of the American Association for the Advancement of Science, American Institute of Mining Engineers, American Electro-chemical Society, and of the American Jersey Cattle Club. During his residence of thirty years on Staten Island he was active in the promotion of every movement looking to the advancement of the Island's interests; was a member of the Staten Island Association of Arts and Sciences; a member of the Staten Island Chamber of Commerce (at one time its treasurer), serving as a member of its committee on borough parks; was a member of the advisory committee (appointed by the trustees of the New York Public Library) on the establishment of libraries on Staten Island; took an active

part as one of the original founders of the Staten Island Academy.

Mr. Johnston was twice married; first, April 22, 1867, at Mineral Point, Wis., to Miss Sarah Anna Atkins, who died in 1878; second, at Clifton, S. I., December 1, 1882, to Mrs. Isabel Ormsby Turell. Two sons, by the first marriage, Wilbur Hamilton and Frederick Atkins, with the widow and her daughter, Mrs. G. Herbert Daley, all of Stapleton, S. I., are left to mourn his death.

In all things he fulfilled the part of a public-spirited citizen, doing whatever duties devolved upon him in that relation promptly, energetically, and with judgment and fairness. An exemplary man in all relations, he lived a life beyond reproach. He will be missed by a wide circle of friends, most of all by those whose intimate association made them most familiar with his inmost thoughts and aspirations.

F. L. H.

DR. HARRY ADLAI STEVENSON.

DIED, at St. Joseph's Hospital, Bloomington, Ill., September 18, 1909, of brain fever, Dr. HARRY ADLAI STEVENSON, D.D.S., in his thirty-sixth year.

Dr. Harry Adlai Stevenson died at St. Joseph's Hospital, Bloomington, Ill., September 18, 1909, following an illness of several weeks' duration, from which he had been seeking relief for several years at various resorts.

The decedent, who was a nephew of former Vice-president Adlai Stevenson, was born at Bloomington, Ill., September 27, 1873, where he attended the ward schools. For a short time he went to Wesleyan, but soon afterward entered the preparatory school at Andover, Mass. He attended the Rush Medical College in Chicago for one year, and later entered the Chicago Dental College, from which he was graduated in 1898. He then settled at Bloomington, where he has been practicing dentistry until a year and a half

ago, when his health obliged him to resign his professional activities.

He married, in December 1903, Miss Bessie Coykendall of St. Paul, Minn., who, together with a daughter, Ann Katherine, survives him.

Dr. Stevenson was a man of excellent character, and one of the most prominent dentists in Bloomington. He was a member of the McLean County Dental Society, the Illinois Club, the Country Club, and the Jesse Fell Lodge, Knights of Pythias.

DR. J. T. CALVERT.

DIED, on October 6, 1909, at his home in Spartanburg, S. C., J. T. CALVERT, D.D.S., in his fifty-sixth year.

In the death of Dr. Calvert the profession generally and the South Carolina State Dental Association in particular has lost one of its staunchest and most able supporters. He was an ex-president of his state association and member of its board of examiners; also a member of the old Southern, in which he took a great and fond interest, continuing as a member of the National and attending all meetings in his power.

Dr. Calvert was graduated at the Baltimore College of Dental Surgery and the Nashville Medical College, in dentistry and medicine respectively. He was known as a most skilful and ingenious workman, and contributed many appliances and original ideas to the profession. His conscientious attention to business won the admiration of his patients, and the ethical manner in which he conducted his practice gained him the confidence and respect of his *confrères*.

Outside of his profession he enjoyed a large acquaintance, and although of a modest and retiring disposition, his manly and generous nature endeared him to a number of intimate friends.

A widow and four children survive him.

SOCIETY NOTES AND ANNOUNCEMENTS.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

THE twenty-eighth annual session of the National Association of Dental Examiners will be held at Denver, Colo., on Monday, August 1, 1910, commencing at 10 A.M. Hotel and railroad rates will be given in a later issue.

CHARLES A. MEEKER, *Sec'y*,
29 Fulton st., Newark, N. J.

INSTITUTE OF DENTAL PEDAGOGICS.

THE seventeenth annual meeting of the Institute of Dental Pedagogics will be held at the King Edward Hotel, Toronto, Can., December 28, 29, and 30, 1909.

The institute is composed of dental teachers of the United States and Canada. An excellent program has been prepared, and matters of vital interest in the advancement of dental education are under discussion. Interesting and valuable teaching methods and appliances will be exhibited.

Dental teachers, examiners, and ethical practitioners who are interested in the advancement of dental education are cordially invited.

Further particulars can be had from the chairman of the Executive Board, Dr. H. E. Friesell, Dental Department, University of Pittsburg, Pittsburg, Pa.

BRAZIL—FREE ACADEMY OF ODONTOLOGY

ORGANIZED AT PORTO ALEGRE.

THE COSMOS has received the following communication announcing the establishment of a "Free Academy of Odontology" at Porto Alegre, Rio Grande do Sul, Brazil:

"Dear Sir,—By order of the director I would notify you that in this city a Free Academy of Odontology has been organized for giving a course of instruction in stomatology for surgeon-dentists with diplomas from dental schools recognized by the federal government.

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"The course will last one year, and comprise the following studies: (1) Anatomy and physiology, as related to stomatology. (2) Anatomy and pathologic physiology. (3) Pathology and bacteriology. (4) Legal medicine and deontology. (5) Stomatologic clinics.

"Besides this, every candidate has to write a thesis in order to obtain a degree of Doctor of Odontology.

"The pupils will be either matriculates or auditors.

"JORGE DE FIGUEREDA, *Sec'y*."

ODONTOGRAPHIC SOCIETY OF WEST PHILADELPHIA.

THE next meeting of the Odontographic Society of West Philadelphia will be held Monday, December 6, 1909, at 8 P.M., in the amphitheatre of Dental Hall, University of Pennsylvania. At this meeting Dr. L. Ashley Faught, a member of the faculty of Medico-Chirurgical College, will read a paper on "Choice of Filling Materials."

R. R. PARKS, *Sec'y*.

DR. GREENE VARDIMAN BLACK TO BE HONORED.

THE Chicago Odontographic Society desires to inform the dental profession that the association is to give a testimonial banquet in honor of Dr. Greene Vardiman Black, in the city of Chicago, during the last week of January, 1910.

WM. H. G. LOGAN, *President*,
FRANK H. ZINN, *Sec'y*.

G. V. BLACK DENTAL CLUB OF ST. PAUL.

ANNUAL CLINIC.

It is a pleasure to announce that the program is almost prepared for the annual clinic of the club, which will be held in St. Paul on February 24 and 25, 1910.

The members of the club will make opera-

tions on the first day of the clinic, while the second day's operations will be made by the members of other study clubs.

Essays will be read by Dr. Barnes of Seattle, Dr. Chappel of San Francisco, Dr. Friesell of Pittsburg, Dr. C. N. Johnson of Chicago, and Dr. C. E. Woodbury of Council Bluffs, Iowa.

On Thursday evening Dr. G. V. Black of Chicago will deliver a lecture, which will be illustrated.

The profession generally is invited to attend the meeting. The program for the clinic will be published later. For further information address

R. B. WILSON, *Sec'y*,
409 Amer. Nat'l Bank Bldg., St. Paul, Minn.

OHIO STATE DENTAL SOCIETY.

THE forty-fourth annual meeting of the Ohio State Dental Society, to be held in Columbus on December 7 to 9, 1909, promises to be one of the very best in the history of this society. The program contains the names of such men as Drs. M. L. Rhein, I. N. Broomell, Marcus Ward, C. P. Pruyn, and Sidney Rauh of Cincinnati. The president, Dr. W. H. Whitslar, will give a stereopticon lecture on Tuesday evening on "The Human Hand." Dr. Whitslar has talked on this subject elsewhere, and is a known authority on palmistry.

The clinic program is the longest in the history of the society and will be instructive to all. The Arrangements Committee will provide a social feature for the entertainment of the members and guests, giving all an opportunity to become better acquainted.

Many new members have been added through the organization of component societies. Let every member come and bring a friend. A royal welcome and good time await you.

F. R. CHAPMAN, *Sec'y*,
Columbus, Ohio.

PENNSYLVANIA STATE DENTAL SOCIETY.

At the annual meeting of the Pennsylvania State Dental Society the following officers were elected for the year 1909-10: W. D. DeLong, Reading, president; C. C. Walker,

Williamsport, first vice-president; W. H. Fundenberg, Pittsburg, second vice-president; L. M. Weaver, Philadelphia, recording secretary; J. H. Crawford, Pittsburg, corresponding secretary; W. A. Spencer, Carbondale, treasurer.

Council—For one year: C. C. Taggart, Pittsburg; J. T. Lippincott, Philadelphia, and E. J. Donnegan, Scranton. For two years—Geo. T. Root, Philadelphia; H. E. Friesell, Pittsburg, and J. G. Lane, Philadelphia. For three years: A. P. Lee, Philadelphia; W. L. Fickes, Pittsburg, and J. F. Biddle, Pittsburg.

Board of Censors—R. J. Seymour, Philadelphia; R. R. Hutchison, Pittsburg; C. V. Mierley, Huntington; J. E. Nyce, Philadelphia, and O. M. Sorber, Pittsburg.

Program Committee—C. V. Kratzer, chairman, Reading; Joseph Huggins, Downingtown; W. C. Middaugh, Easton.

Clinic Committee—Victor Cochran, Philadelphia; C. O. Booth, Pittsburg; J. C. Hertz, Easton.

Publication Committee—L. M. Weaver, Philadelphia; W. S. Eisenhart, York; F. H. Magill, Washington.

Committee on Ethics—O. L. Hertig, Pittsburg; C. M. Bordner, Shenandoah; B. F. Place, Norristown.

Committee on Dental Science and Literature—A. P. Lee, Philadelphia.

Committee on Necrology—W. H. Trueman, Philadelphia; W. H. Scholl, Reading; H. W. Arthur, Pittsburg.

Committee on Local Arrangements—A. S. Koser, Harrisburg; E. P. Kremer, Lebanon; W. B. Mausteller, Harrisburg.

Exhibit Committee—C. F. Keim, Harrisburg; H. W. Bohn, Reading; W. L. Keller, Harrisburg.

Legislative Committee—Geo. F. Root, Philadelphia; J. E. Nyce, Philadelphia; M. C. Barner, Jersey Shore; W. C. Hoeffer, Pottsville; J. M. Crosby, Bradford.

Committee on Enforcement of the Dental Law—F. D. Gardiner, Philadelphia, chairman; J. T. Lippincott, Philadelphia; J. H. Crawford, Pittsburg; C. E. Peters, Pittsburg; W. H. Sowash, McKeesport; C. E. Grim, Reading; J. F. Kingsley, Tonawanda; C. C. Laubach, Scranton; H. Zimmerman, Annville; W. E. Wilson, Huntington; W. H. Lowell, Lancaster.

Committee on Oral Hygiene and Public

School Dental Education—G. S. Schlegel, Reading, chairman; C. S. Van Horn, Bloomsburg; D. S. Gardner, Scranton; W. L. Fickes, Pittsburg; J. A. Standen, Philadelphia.

Committee on Reorganization—J. G. Lane, Philadelphia; P. B. McCollough, Philadelphia; J. C. Salvay, Philadelphia.

MARQUETTE UNIVERSITY, DENTAL DEPARTMENT.

ALUMNI ASSOCIATION.

THE fourth annual clinic and manufacturers' and dealers' exhibit of the Alumni Association, Dental Department Marquette University, will be held in the Milwaukee Auditorium, Milwaukee, Wis., January 18 and 19, 1910.

Every effort is being made to make this the most successful and interesting meeting of our society. Men of national reputation will give clinics.

All ethical practitioners are cordially invited to attend.

W. F. STRAUB, *Sec'y*,
721 Third st., Milwaukee, Wis.

IOWA BOARD OF EXAMINERS.

THE Iowa State Board of Dental Examiners will hold a meeting for the examination of candidates for license to practice dentistry in Iowa, beginning January 10, 1910, at 9 A.M., in Des Moines.

For blanks and other information write
E. D. BROWER, *Sec'y*,
Le Mars, Iowa.

TEXAS BOARD OF EXAMINERS.

THE regular meeting of the Texas State Board of Dental Examiners will be held in Dallas, Texas, beginning 9 A.M. Monday, December 13, 1909. Diplomas not recognized or registered. Examination required of all. No interchange of license with any other state. No special examination to practitioners already in active practice. Applications, accompanied by a fee of twenty-five dollars, should be in the secretary's hands by December 10th. For further information address

BUSH JONES, *Sec'y*, Dallas, Texas.

PENNSYLVANIA BOARD OF EXAMINERS.

THE Board of Dental Examiners of Pennsylvania will conduct examinations simultaneously in Philadelphia and Pittsburg, December 8 to 11, 1909.

For application papers or other information address

Dr. NATHAN C. SCHAEFFER,
Sec'y Dental Council,
Harrisburg, Pa.

KANSAS BOARD OF EXAM- INERS.

THE Kansas State Board of Dental Examiners will hold a meeting, for the examination of candidates for license to practice dentistry in Kansas, in Topeka, beginning December 7, 1909, at 9 A.M. For blanks or other information write to the secretary.

F. O. HETRICK, Ottawa, Kans.

RHODE ISLAND BOARD OF REGISTRATION.

THE Rhode Island Board of Registration in Dentistry will meet for the examination of candidates at the State-house, Providence, R. I., Tuesday, Wednesday, and Thursday, December 28, 29, and 30, 1909. Application blanks and particulars may be obtained from

H. L. GRANT, *Sec'y*,
1025 Banigan Bldg., Providence, R. I.

NEW JERSEY BOARD OF REGISTRATION.

THE New Jersey State Board of Registration and Examination in Dentistry will hold its semi-annual meeting in the Assembly Chamber of the State-house at Trenton, N. J., beginning Monday, December 6th, and continuing through the 7th and 8th.

Applicants for examination must file photograph and preliminary credentials with the application or it will not be received. Sessions begin promptly at 8 A.M. each day. Monday, December 6th, will be devoted to practical examination, Tuesday and Wednesday to theoretical examination.

Applications must be filed ten days prior to the meeting.

CHAS. A. MEEKER, *Sec'y*,
29 Fulton st., Newark, N. J.

NEW HAMPSHIRE BOARD OF REGISTRATION.

THE next meeting of the New Hampshire Board of Registration in Dentistry, for examination, will be held at Masonic Banquet Hall, Manchester, N. H., December 7, 8, and 9, 1909.

No special examinations. All persons must become registered before beginning practice.

A. J. SAWYER, *Sec'y*,
Manchester, N. H.

CALIFORNIA BOARD OF EXAM- INERS.

THE next meeting of the Board of Dental Examiners of California will be held in San Francisco beginning on December 9, 1909. This meeting is for the purpose of examining applicants for licenses to practice dentistry in this state. Applications for same must be filed with the secretary ten days before the examination. The examination fee of twenty-five dollars and the credentials must accompany the application.

C. A. HERRICK, *Sec'y*,
San Francisco, Cal.

INDIANA BOARD OF EXAM- INERS.

THE next meeting of the Indiana State Board of Dental Examiners will be held in the State-house, Indianapolis, January 10 to 14, 1910. All applicants for registration in Indiana will be examined at this time. For further information address

F. R. HENSHAW, *Sec'y*,
507 Pythian Bldg., Indianapolis.

DISTRICT OF COLUMBIA BOARD OF EXAMINERS.

At the fall meeting of the District of Columbia Dental Board of Examiners the following officers were elected: Dr. Starr Parsons, president, and Dr. Chas. W. Cuthbertson, secretary.

The Board of Dental Examiners for the District of Columbia will hold their semi-annual examination January 3 to 5, 1910. Applicants for examination must file applications, accompanied by fee of \$10.00 and photograph, with the secretary at least ten days before the date of examination.

CHAS. W. CUTHBERTSON, *Sec'y*,
309 Seventh st., N. W., Washington, D. C.

UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING OCTOBER 1909.

October 5.

No. 936,131, to GUSTAV HOLTZ. Dental or surgical chair.

October 12.

No. 936,361, to FRED'K ROSE. Artificial tooth.

No. 936,539, to ALEX. JAMESON. Casting apparatus.

No. 936,633, to F. O. JAKUES. Dental swager.

No. 936,732, to WM. H. MANNING. Dental instrument.

No. 936,903, to JAS. W. IVORY. Artificial tooth.

October 19.

No. 937,683, to ROSA MATWEFF. Composition for treating teeth.

October 26.

No. 937,964, to ORRIN J. SAYERS. Casting machine.

No. 938,421, to GEORGE B. HAKINS. Tooth-brush.

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
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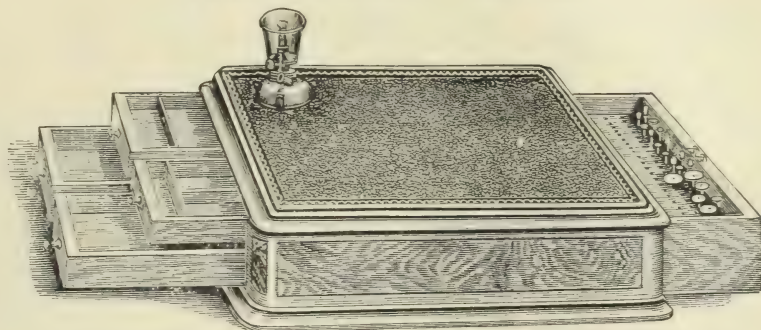
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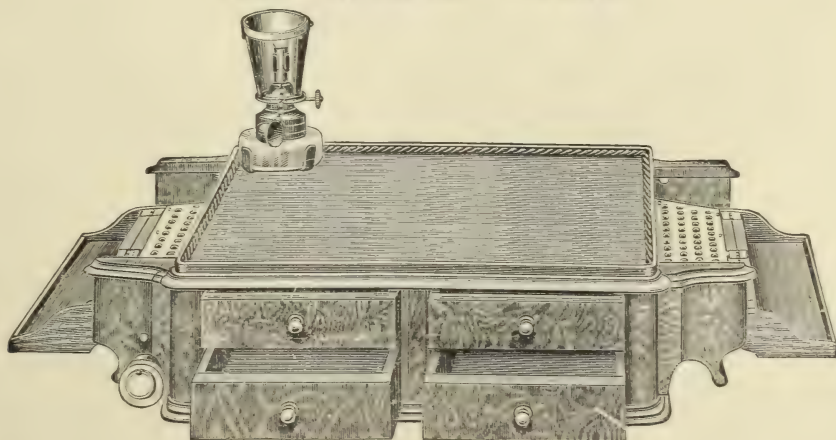
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
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Continuation of A FACTORY TOUR]

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As a fitting sequel to "A Factory Tour", in which our readers were shown the making of Porcelain Teeth, we shall tell this month of that department of our business through which the product of the Tooth Factory reaches the dental profession.

Our Tooth Sales Department long ago outgrew the available space on the store floor, necessitating the provision of additional room on the fourth floor.

STOCK

Our Stock of Porcelain Teeth embraces probably two to three times as great a variety of molds as its closest competitor. At the Philadelphia House, which, as headquarters, endeavors to carry sufficient stock to fill all quantity orders from all our Branch Houses and the dealers in the United States and abroad, the most complete line of these molds and shades is to be found. Our stock of Porcelain Teeth at Philadelphia usually approximates 7½ millions, comprising the greatest variety of forms and shades in the world. The next best assortments are to be found at our largest Branch Houses. The smaller Branches necessarily confine their stock to the needs of the local demands. It is our wish to place these stocks of Porcelain Teeth at the service of all dentists, irrespective of their location.

ARRANGEMENT

Such a stock would be practically useless unless systematically arranged for easy access. To "house" the stock of Philadelphia House requires 8892 drawers and trays, occupying with the necessary room for convenient handling nearly 4700 square feet of floor space. In these drawers and trays the stock is arranged not only according to molds but according to the shade of each mold, except "miscellaneous" teeth, which are arranged by shade only. Every part of it is thus instantly available, making quick handling easy.

Marketing a World Product (Continued)



TOOTH SALES DEPARTMENT (FOURTH FLOOR)

Space occupied, 63 x 44 feet. 5508 Tooth Drawers and Trays, carrying about 60 per cent. of the combined working stock. The portion of the room not seen (at the left) contains the stock of Plain-Long-Pin (Flat Back) Teeth.

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An elaborate book-keeping system records the actual movement of every set of teeth received from the factory. Modern appliances of the most approved sort, as adding machines, assist in the keeping of these records. The figures thus compiled are the basis of factory orders, and they assure that our stock shall be "live" throughout, by indicating for elimination the teeth which are inactive.

HUMAN EQUIPMENT

To care for the stock, keep the necessary records, and fill orders requires a large force of clerks, each of whom has special duties to perform, developing as a natural consequence the highest efficiency, of which our patrons reap the benefit. The fact that all of this large corps of employees devote their entire time to the tooth business of the company emphasizes its vastness.

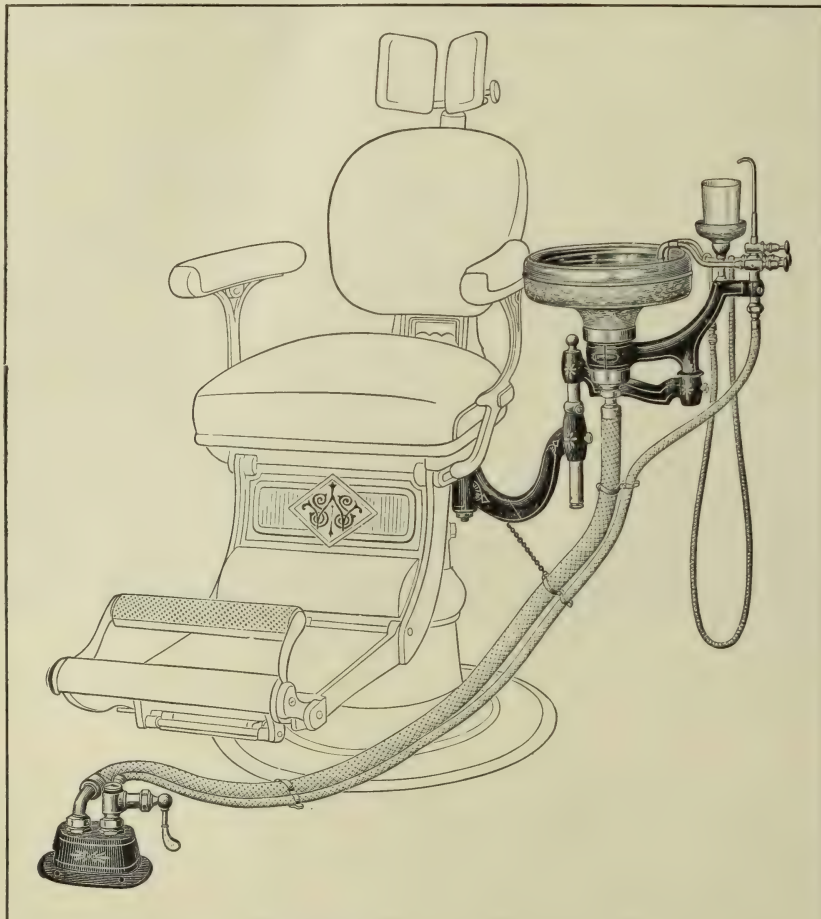
MAIL ORDERS

One of the most important branches of the work is the Mail Order Department. Mail Orders have the right of way, and are rushed through in the shortest possible time consistent with proper execution. The clerks here become so skilled that their judgment in the filling of orders is not to be excelled by that of the dentist himself. Mistakes by them are rare.

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S. S. White Detached-Post Crowns and Diatorics can also be readily mounted removably.

One immeasurable advantage which these forms of ours offer is the wide range of selection in shapes and shades which they afford. Almost any tooth can be matched in them. Another advantage is that ground surfaces can be polished.

Herewith are simple methods for mounting each of the forms referred to above.

Plain Long-Pin Teeth as Removable Facings

Make your abutments in any of the usual methods, select and grind the facings, make backings, oil the backs of the facings and the pins, and wax all up together on the model, allowing the pins to project through the holes in the backings. Try in the mouth; when satisfactory, replace on the model, and remove the facings carefully. In the holes left by the pins, set carbon points

FIG. 1

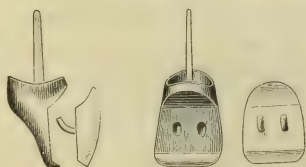


FIG. 2

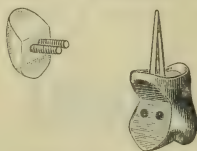
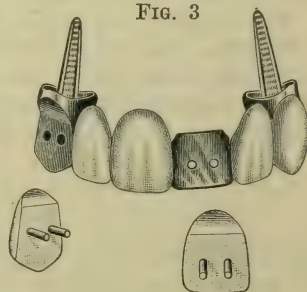


FIG. 3



cut from the lead of an ordinary pencil, as near the diameter of the tooth pins as possible, and projecting out of the facing side of the backing say an eighth of an inch. (Just prior to the final investment, with a camel-hair brush coat the facing side of the backing with the investment material mixed thin.) If the piece is to be completed by the casting process, attach sprue or

sprues, and invest in the casting ring; if to be completed by soldering, invest in the usual way. After the piece is cold, bur out the carbon points, roughen the pins of the facings and set with cement. The pins can be fixed by the Bryant process, if preferred.

Where the backing is thin, the pins should be bent slightly toward the heel of the crown so as to insure the full hold of the pin.

Fig. 1 gives views of a removable plain long-pin facing with pins bent to secure a hold in a thin backing. With Fig. 2, which shows a plain long-pin tooth with pins roughened or screw-threaded, and a backing ready to receive the facing, it gives a good idea of the entire process.

Fig. 3 shows a bridge with removable facings made of plain long-pin teeth.

SS Diatorics and Detached-Post Crowns Mounted Removably

Select proper teeth and grind to place, leaving them slightly shorter to allow for thickness of gold capping. From No. 36 pure gold, swage caps for each tooth, and if desired put pin through each and solder to cap. Trim to proper length labially and lingually. The caps may be cast if desired.

With abutments in position arrange the dummies with their gold caps in proper alignment with a little wax. Carefully remove teeth from their position in the gold caps, leaving the latter undisturbed in the mouth. Then take the impression of these and the abutments in investment material and remove

FIG. 4

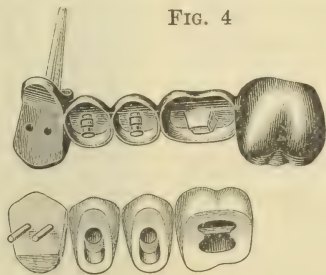
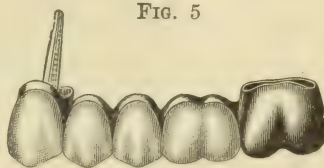


FIG. 5



the whole piece from the mouth. Boil out wax, and solder caps and abutments together.

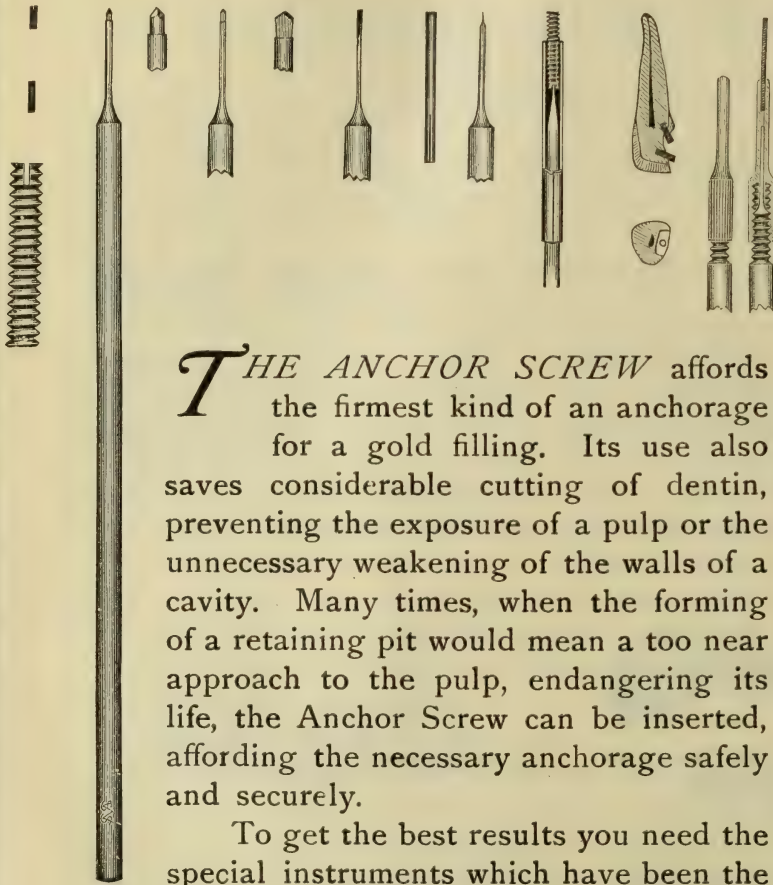
Fig. 4 is a bridge with removable teeth, including a plain long-pin facing, two detached-post crowns, and a diatomic tooth. Fig. 5 shows how perfectly these forms blend in the completed bridge.

In case any repair is necessary simply select the duplicate of the broken tooth, grind to place and cement without removing from the mouth.

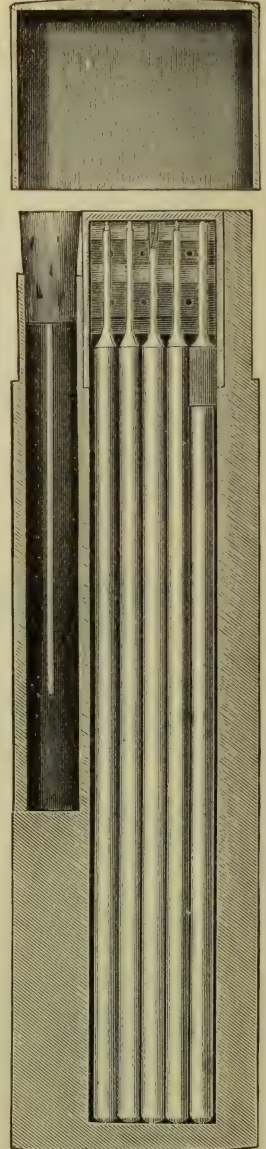
SS Detached-Post Crown as a Jacket Crown

Grind the crown or stump down to a peg-shape, with a shoulder all around at the gingival line, and make a matrix of platinum for it just as for a carved jacket crown. Select a detached-post crown and re-shape the cavity with gem, carborundum or diamond points to approximate the shape of the dressed stump, but somewhat larger. Place the matrix in position, fill the enlarged crown cavity with moist porcelain (High-Fusing), set the crown in place and press home; remove the whole, clean off excess of porcelain, and fuse. If necessary, again apply porcelain and re-fuse. When properly fitted, remove the matrix and cement the crown to place.

ANCHOR SCREWS AND APPLIANCES



CASE FOR ANCHOR SCREW
APPLIANCES



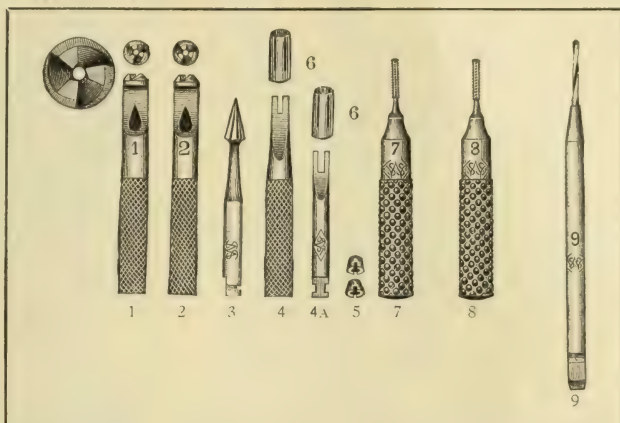
THE ANCHOR SCREW affords the firmest kind of an anchorage for a gold filling. Its use also saves considerable cutting of dentin, preventing the exposure of a pulp or the unnecessary weakening of the walls of a cavity. Many times, when the forming of a retaining pit would mean a too near approach to the pulp, endangering its life, the Anchor Screw can be inserted, affording the necessary anchorage safely and securely.

To get the best results you need the special instruments which have been the reliance for twenty-odd years of those who have enjoyed the benefits of the method. They are five in number, a Starting or Center Drill, a Limit or Anchor Drill, a Screw-Tap, Screw-Driver and Sleeve, and an Anchor Screw Chuck. These instruments enable you to drill the holes and tap them with exactness, and then to insert the Screws accurately and easily.

The instruments alone cost only \$2.25, and you can buy the Screws of gold or iridio-platinum; also, Screw-wire of either kind in two-inch lengths. A complete set, including the five instruments, six gold Anchor Screws, and two inches of Gold Anchor Screw Wire, in a slip-top case, costs \$4.50.

But you'd better read the detailed description in our Instrument pamphlet and get fuller particulars.

Be Prepared



WHEN, as sometimes happens, a facing is broken from a bridge, the Bryant Bridge Repair Tools put you in position to quickly repair the mischief, without removing the bridge, and with little discomfort to the patient. You simply attach the new facing by means of threaded gold nuts, which hold it as securely and permit as artistic a finish as in the original operation. The set is complete for the work and its advantages are applicable to all styles of bridge work.

The regular sets consists of Nos. 1, 2, 3, 4, 5 and 6. No. 3 is operated with the Right-Angle; the others with thumb and finger. No. 4 A, a nut-driver for Right-Angle, is extra, as are also the Drill and Screw-Taps, Nos. 7, 8, 9, which extend the field of the tools to all dental operations where small threaded nuts are required.

In ordering Nos. 3 and 4 A, state for which Angle Appliance it is wanted.

PRICES

Nos. 1 and 2. Tooth-pin Dies	each	\$0.75
No. 3. Right-Angle Reamers	"	.25
" 4. Nut-Driver with Holder	"	.25
" 4A. Nut-Driver with Holder for Angle Appliances	"	.25
" 5. Gold Nuts	"	.50
" 6. Holder for No. 4 or No. 4A	"	.10
The set in box containing one each of Nos. 1, 2, 3, 4, and two of No. 5		3.00
Nos. 7 and 8. Screw-Taps	each	.75
" 9. Drill, for No. 7 Handpiece only	"	.30

Full description in our Crown and Bridge-Work Pamphlet

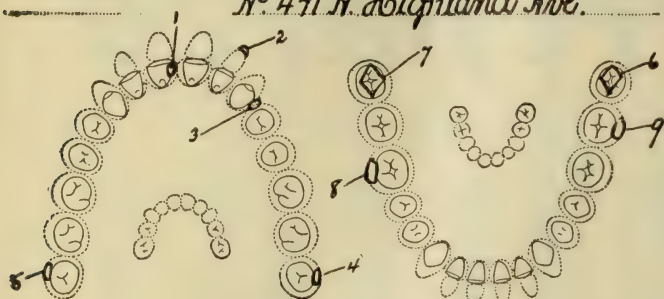
RECORD CARD

SYSTEM NO. 1

Mr. J. H. Robertson

p. 283

No. 471 N. Highland Ave.



SUGGESTED BY S. H. GUILFORD, A. M., D. D. S.

DATE	No.		HRS.	DR.	CR.
1901 Feb.	3	Examination	1/2	3	
"	7	Gold filling	1	5	
"	15	23	1 1/2	7.50	
"	24	4.5 Ph. Zinc	3/4	4	
"	24	6.7 Amal.	3/4	4	
Mar.	5	8.9 Gutta Percha	1	5	
				28 50	
Mar.	13	By Cash			8 50
Apr.	1	"			10
May	1	"			10
					28 50

RECORD CARD

SYSTEM NO. 2

Miss A. M. Moore

p. 196

1829 Main St.



1906

9

DATE	No.		HRS.	DR.	CR.
June	2	1 Cement Filling	1/2	2	
"	5	2 Porcelain Inlay	1	10	
"	7	3 Gutta Percha Filling	1/2	2	
"	10	4 Treatment	1	5	
"	17	5 Gold Crown		10	
"	17	6 " Filling	1 1/2	8 50	
"	20	7 3 Tooth Bridge		30	
"	25	8 Gold Inlay	1	10	
July	2	9 Amalgam (Free Dental)	3/4	3 50	
				81 00	
July	5	By Cash			81 00

S. S. WHITE CARD INDEX SYSTEMS

Are you needing a new ledger?
Look into our Card Index System, and you will adopt it.

First is the Record Card, one to each patient's account, with ample room to keep that account for years.

Every account must be in one of three stages: First, it is active—the work is in progress for the patient; second, it is passive—the work has been completed, and the bill sent out, but not yet paid; third, it is settled, with all that the word implies.

Active accounts are kept, at the front of the case, with alphabetical guide cards for easy reference; passive accounts are next, with different colored guides; settled accounts are kept at the rear, with still different colored guides.

When you open an account with a patient, you simply inscribe name and address on a Record Card, put it in its proper alphabetical place with the active cards, enter charges as the work progresses, and follow the routine indicated in the two preceding paragraphs.

Second, there is the Bill Card, on which you enter total of each bill sent out, erasing it when paid.

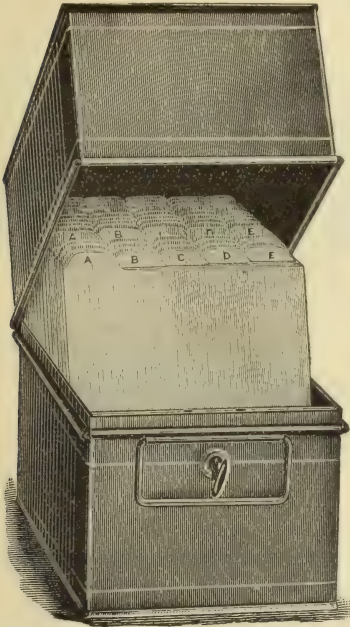
Third, the Bill Card answers also as a Cash Card, on which you keep your cash account, entering in one column all cash received, in the other all amounts paid out.

You will find our Card Index System a simple, complete, satisfactory method of keeping your accounts. One principal advantage is its elasticity; it provides for unlimited expansion.

We offer Card Index Systems No. and No. 2. The only difference is in the diagrams.

CARD INDEX SYSTEMS Nos. 1 and 2—Continued

TIN CASE FOR EITHER SYSTEM



Actual size of Tin Case Outfit, 5 in. wide,
8½ in. long, 7½ in high

CASH OR BILL CARDS ALIKE IN BOTH SYSTEMS

1906		Bills		REC'D	PAID
July	1	Andrews, A. F.	13	50	
	1	Achson, A. W.	20		
	1	Gray, W.	38		
	1	Green, M. O.	87	50	
	1	Gilbert, C. L.	47		
	1	Hausman, A.	42	75	
	1	James, G. F.	21	50	
	1	Jones, J. P.	68		
	1	Klauder, M. F.	96		
	3	Moore, A. M.	81		

1906		Cash		REC'D	PAID
July	5	Moore, A. M.	81		
	5	Jones, J. P.	68		
	5	Hausman, A.	42	75	
	5	Syer, R. S.	90	50	
	6	Sealingood, W.	13		
	6	Gray, W.	38		
	6	Achson, A. W.	20		
	7	Cummings, P. J.	68		
	7	Gilbert, C. L.	47		
	7	Foster, V.	10	50	

A complete outfit consists of a pad of Examination Blanks containing the same diagram as the Record Cards, 300 White Record Cards (see opposite page), 15 Cash or Bill Cards, as above, with three sets of Guides. Cards and Guides are 5 x 7 inches in size. The outfit is sold in a japanned tin case with lock and key as illustrated.

The "Record Cards" (white) correspond to what in an ordinary set of books would be a ledger account. The use of the "Cash or Bill Cards" (blue) is indicated by their name,—one form answering for both purposes.

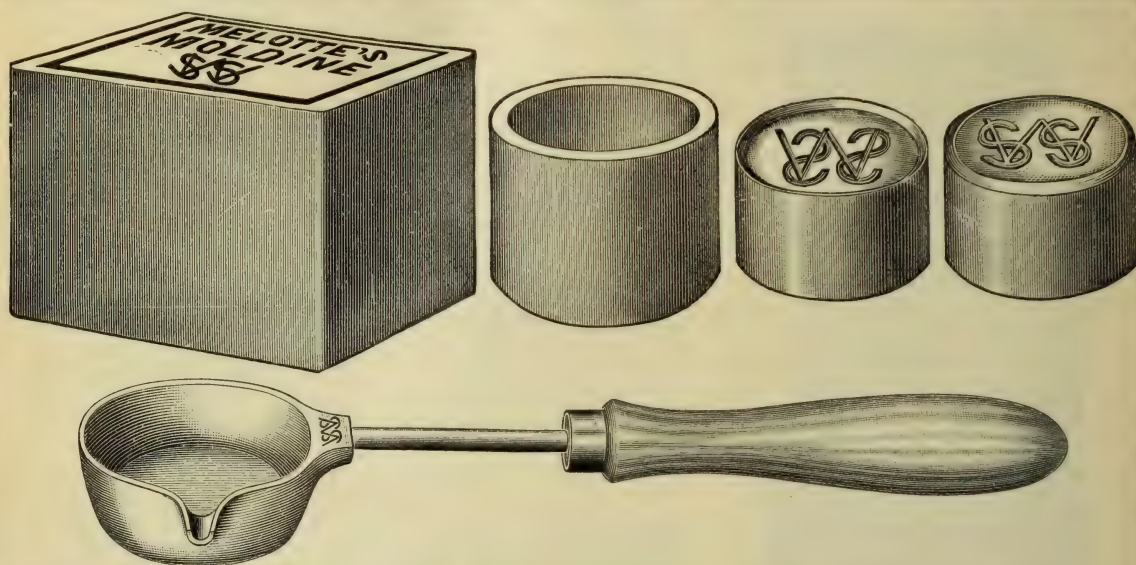
The Guides tell at a glance the condition of any live account. They are of three colors,—buff, salmon, and blue,—a full alphabetical index of each, which are used as described on the opposite page, say: The Buff for active accounts, the Salmon for passive accounts, and the Blue for settled accounts.

We are prepared to supply Card Index System No. 2, with the Record and Bill Cards ruled for Sterling money, for use in Great Britain and her colonies.

PRICES

Outfit complete, either system	\$5.00
Extra Cards, Guides, and Examination Blanks can be bought at any time.	
Record Cards, either system, per hundred .....	.75
Cash or Bill Cards, package of 25 .....	.25
Guides, either color, per set .....	.50
Guides, three sets (one of each color)	1.50
Examination Blanks No. 3 (for Card Index System No. 2) per pad of fifty.	.15
Examination Blanks No. 4 (for Card Index System No. 1) per pad of one hundred .....	.20


A TIME-SAVER AND LABOR-SAVER



Naturally you want to do your work as rapidly as you can consistent with proper execution. If you don't know the advantages of the **Melotte Moldine Outfit**, you can't learn them too soon. It's a time-saver and labor-saver; enables you to take a quick impression of a tooth or two or a root or two and run a model at once. You just apply a lump of the Moldine to the parts, clap the rubber ring over it, melt sufficient of the Fusible Metal (and it's a good one) in the ladle, pour it into the ring, and as soon as it cools,—in two or three minutes,—your model is made. You'll often have use for it in crown, bridge, inlay, and casting work.

PRICES

Complete Outfit, inclosed in a wooden box containing one-half pound Moldine, one Melting Ladle No. 8, one Ring, and two ingots of

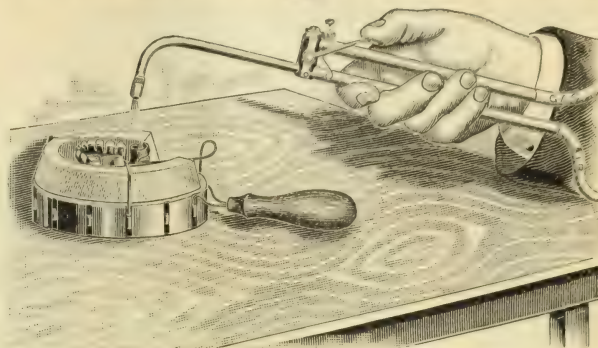
Fusible Metal	\$1.15
Melotte's Moldine	per half pound .25
Melting Ladle ( No. 8) .....	.25
Rubber Ring .....	.07
Melotte's Fusible Metal, per ingot (about 2½ ozs.) .....	.30

Melotte's Soldering Outfit

Cheap in the best sense because complete, convenient, efficient.

Reversible pad of wourd asbestos tape, with detachable rim for confining the heat; clamps for holding work, which you can set at any point. Melting cup and ingot mold. Blowpipe with flame under perfect control.

Will do any soldering from a band to a full case.



Crown and Bridge-Work Pamphlet

Blowpipe Pad, complete \$2.00

Blowpipe 3.00

THE S. S. WHITE DENTAL MFG. CO., Sole Sales Agent

Band-Forming Pliers Wire-Stretching Pliers

These two devices by Dr. Edward H. Angle greatly assist the practitioner of orthodontia, the first in adapting the plain bands of his regulating appliances; the second in manipulating the brass ligature wires. Both are fully illustrated and described in our

Forceps Pamphlet

Crenshaw Contour Matrices

No. 5 for Incisors and Cuspids

No. 6 for Bicuspid and Molars

Price Each \$3.00

Operative Instruments Pamphlet

Hollingsworth's Crown and Bridge-Work Appliances

240 Cusp Forms for Bicuspid and Molars

40 Cusp Forms for Incisors and Cuspids

The entire system fully exploited in our Crown and Bridge-Work Pamphlet

The Simonson Mouth-Piece for Saliva Ejectors

Orifice protected from stoppage by the "return" of the end of the tube

Furniture Pamphlet



DONALDSON'S

Pulp-Canal Cleansers

*Extremely Tough
Barbs Cut Regularly*

With Handles, box of 6 \$1.75
Without Handles, package of 6 1.25

Nerve Bristles

*Thin and Tough
Hooked, Roughened, Plain*

With Handles, box of 6 \$1.25
Without Handles, package of 675

Operative Instruments Pamphlet

Hill's Stopping

The oldest of Gutta-Percha Stoppings. On the market over half a century, and still commanding a wide sale. Makes an excellent filling, with the advantages which gutta-percha confers.

In $\frac{1}{2}$ -oz., $\frac{1}{4}$ -oz., $\frac{1}{10}$ -oz., $\frac{1}{20}$ -oz. boxes.

Price per oz. \$5.00

Filling Materials Pamphlet

Pyrozone (H_2O_2)

Antiseptic, Germicide, and
Bleaching Agent

A Staple Preparation of
Hydrogen Dioxid

Medicinal Pyrozone . . . { per bottle \$0.50
per dozen 4.50

3% Aqueous Solution

Caustic Pyrozone per tube .75

25% Ethereal Solution

Filling Materials Pamphlet

Kearsing's Gold Blocks

Heavy Gold Foil—No. 60—
Semi-Cohesive

*Very soft-working; can be made more cohesive by
annealing*

Four sizes, singly or assorted

Price per $\frac{1}{8}$ oz. \$4.00
" $\frac{1}{2}$ oz. or over per oz. 30.00

Filling Materials Pamphlet

"The Old Reliable" Lawrence's Amalgam

*Made from the same formula for nearly a half
century and always popular*

PRICES

1 ounce	\$3.00
2 "	5.50
4 "	10.00
10 "	20 00
20 "	35.00

Filling Materials Pamphlet

Poulson's Pink Rubber

Half-Pound Boxes

Poulson's Shaded Veneering Rubbers

No. 1 LIGHT PINK—No. 2 DARK PINK

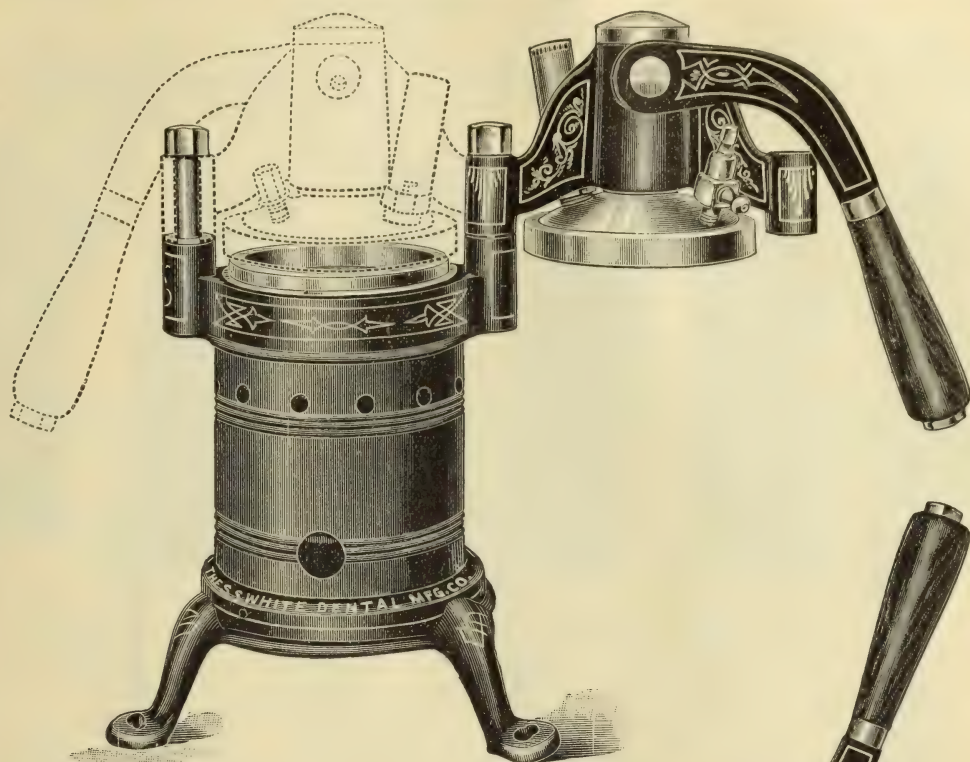
One-Fifth Pound Packages

Well and Favorably Known For Many Years

Vulcanizers and Lathe Pamphlet

THE S. S. WHITE DENTAL MFG. COMPANY

SOLE SALES AGENT

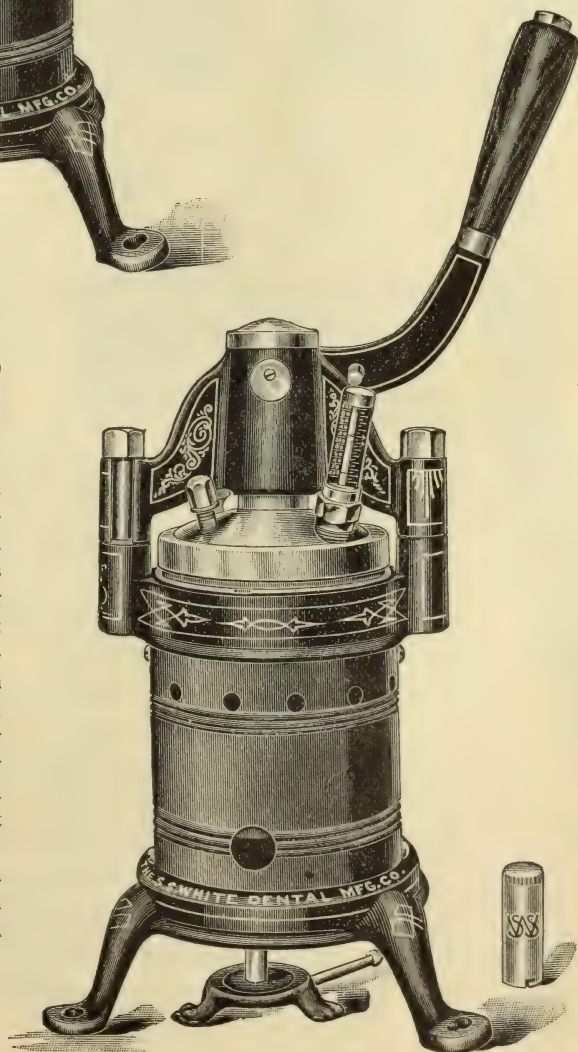


Open

THE MAIN POINT

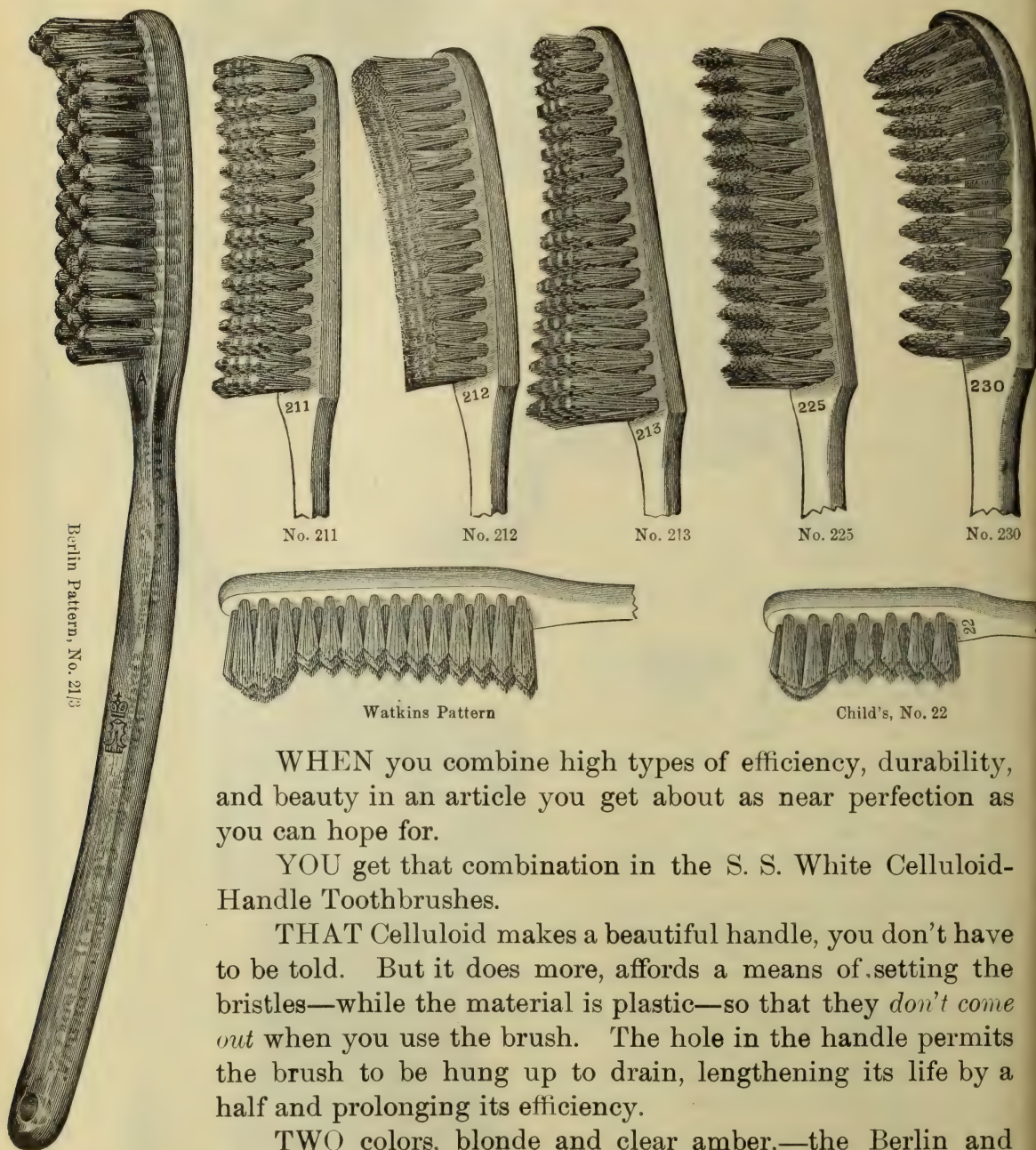
about the S. S. White Vulcanizer, the feature which lifts it above and beyond others, is its ease of manipulation. If you want to open it, you simply pull the lever over till it lifts the lid clear of the pot, then you swing it around to one side. It takes but little effort, and is done almost instantly. You have no further concern about the lid. It is held suspended away from the dirt of the laboratory bench, ready to be swung back over the pot and clamped down securely in its right position. This clamping it down causes no exertion, just a nice, comfortable squeeze, and the lid is on steamtight. Its convenience and cleanliness will be worth a good deal to you in the course of a year.

Our pamphlet on "Vulcanizers and Lathes" gives full details



Closed

S. S. White Celluloid-Handle Toothbrushes



WHEN you combine high types of efficiency, durability, and beauty in an article you get about as near perfection as you can hope for.

YOU get that combination in the S. S. White Celluloid-Handle Toothbrushes.

THAT Celluloid makes a beautiful handle, you don't have to be told. But it does more, affords a means of setting the bristles—while the material is plastic—so that they *don't come out* when you use the brush. The hole in the handle permits the brush to be hung up to drain, lengthening its life by a half and prolonging its efficiency.

TWO colors, blonde and clear amber,—the Berlin and Watkins patterns in the former only; all the others in both.

THREE grades of bristles, hard, medium, and soft.

Price, except No. 22, each \$0.40.....	per dozen \$4.25
" No. 22, each \$0.30	" " 3.25

For sale by all leading druggists and at our salesrooms

The S. S. White Dental Mfg. Co.

DENTAL BOOKS

Some of the Dental Books in the list below will certainly help you; take a moment to run over the titles and make your selections.

- BLACK, G. V.**—Descriptive Anatomy of the Human Teeth. By G. V. Black, M.D., D.D.S. Fourth edition. One hundred and sixty-two pages and one hundred and forty-two illustrations.
Price \$2.50
- CRYER, M. H.**—Studies of the Internal Anatomy of the Face. By M. H. Cryer, M.D., D.D.S., Professor of Oral Surgery, Department of Dentistry, University of Pennsylvania. One hundred and seventy-six pages and one hundred and fifty-one illustrations.
Price \$1.50
- EVANS, GEORGE.**—A Practical Treatise on Artificial Crown, Bridge- and Porcelain-Work. By George Evans, late Lecturer on Crown- and Bridge-Work in Baltimore College of Dental Surgery, etc. Seventh edition. Carefully revised, with the addition of much that is new in both text and illustration.
Price \$4.00
- GUILFORD, S. H.**—Orthodontia, Malposition of the Human Teeth. By S. H. Guilford, A.M., D.D.S., Ph.D., Professor of Operative and Prosthetic Dentistry in the Philadelphia Dental College; Author of "Nitrous Oxid," etc. Fourth edition, thoroughly revised. This edition has been thoroughly revised, and in every way it has been brought abreast with the most recent advances in the department of dental effort of which it treats.
Price, Clothnet \$2.50
- HEWITT, F. W.**—The Administration of Nitrous Oxid and Oxygen for Dental Operations. By Frederick W. Hewitt, M.A., M.D. Third Edition.
Price \$1.75
- JOHNSON, C. N.**—Principles and Practice of Filling Teeth. By C. N. Johnson, M.A., L.D.S., D.D.S., Professor of Operative Dentistry in the Chicago College of Dental Surgery. Third edition, revised and enlarged. Two hundred and ninety-nine pages and one hundred and three illustrations.
Price, Cloth \$2.50
- KNAPP, MILAND A.**—Teeth Regulation. By Miland A. Knapp, D.D.S. Second edition. With Original Devices Ready for Immediate Operative Application Without Soldering. Numerous specific illustrations.
Price \$0.25

THE WARREN IMPROVED DENTAL LEDGER NO. 2 gives simplicity in the statement of your accounts. The diagram shows every surface of all the teeth, permitting the accurate indication of the size of the filling or the kind of operation. If a filling, you can state the kind by a check mark. And finally all details are there right before you when you look at the account. The diagram is printed in red, so that the black ink markings and numbers upon it stand right out. The No. 2 Warren Ledger contains 312 pages, 152 with a single account to the page, 160 with two to the page. Half-bound in American Russia, wine colored cloth sides, red edges, ample index.
Price \$2.50



For Sale. Office equipment and practice in growing central Georgia town of about 15,000, 40 miles of Atlanta. A good thing for somebody; cheap if taken at once. Price \$800 cash or part terms. If interested write at once. Address "DOCTOR," P. O. Box 464, Griffin, Ga.

For Sale. Dental practice in river town of 50,000 people in Iowa. Business \$4000 per year. Best practice in the city. Will sell for invoice. Everything new and up-to-date. Do not write unless you have cash. Address "Good," care The S. S. White Dental Mfg. Co., Chicago, Ill.

For Sale. Well-established practice in small town twelve miles from Los Angeles, California. Well-equipped office, night and day current. Terms \$1000 cash. Address "N. E. Y.," care THE DENTAL COSMOS, Lock Box 1615, Philadelphia, Pa.

For Sale. A \$4000 yearly cash practice located in the best farming section of Montana. Will remain long enough to introduce buyer if desired. Price \$1000. Don't answer unless you mean business and have the cash. Address "MONTANA," care THE DENTAL COSMOS, Lock Box 1615, Philadelphia, Pa.

For Sale. Illinois—Less than invoice, on account of other business. Dental office and fixtures, fine location, city 3000. Two trunk line railroads' division point, factories and farming; on river, good fishing and hunting. Practice \$2000 to \$2500 per year, will sell for \$500 cash. Address "C. H.," care The S. S. White Dental Mfg. Co., Chicago.

For Sale. An ethical \$8000 dental practice. Established eighteen years in a fine Illinois town. Equipment complete and up-to-date. Price \$3500. Address "ROBERT," care DENTAL COSMOS, Lock Box 1615, Philadelphia, Pa.

For Sale. Office and practice. Fine location, growing town of 5000 inhabitants, situated in Shenandoah Valley of Virginia. Practice amounts to \$3000 per year. No opposition, fine chance. Reason for selling, will locate in Baltimore, Md. Price \$2250 cash only. Address "V. B.," care DENTAL COSMOS, Lock Box 1615, Philadelphia, Pa.

For Sale. The oldest dental office and practice in fast-growing city of 100,000 population. Owing to age and ill health I am obliged to change climate, and will sell my practice and office, consisting of reception room, two operating rooms, laboratory, and wash-room, equipped with up-to-date appliances, good library, etc. Established thirty years; practice keeps two of us busy. Price \$3500. None but those meaning business need reply. Address "M.," care C. De Haan & Co., Dental Depot, Des Moines, Iowa.

Fine Opportunity for Right Man. Dentist with well-established, desirable practice in city of 18,000, in Eastern Iowa, going into other business which will take most of his time, desires to introduce to his patrons some man of ability and integrity, who may succeed to his practice. Terms mutually satisfactory can be arranged with the right man. Must be thoroughly satisfied regarding character and ability of applicant. Address at once "R.," care The S. S. White Dental Mfg. Co., Chicago, Ill.

TRADE **DENTUNDO** MARK
 GUARANTEED UNDER THE FOOD AND DRUGS ACT, June 30, 1906
 BY
THE DENTUNDO M'F'G CO.

The oldest and most reliable local anaesthetic
 PRICE: 1-Oz. 80c; 2-Oz. \$1.50; 6-Oz. \$4.00; 12-Oz. \$7.00

For Sale at all Dental Depots and by

THE DENTUNDO M'F'G CO., 264 West 23d St., New York, N. Y.

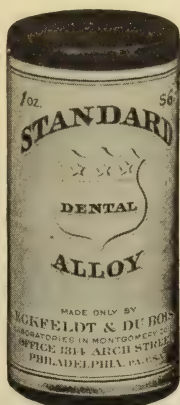
ANTIPHLOGISTINE

(Inflammation's Antidote)

J. A. BLACK, D.D.S., Galveston, Tex., writes:

A young man recently consulted me a week after fracturing his jaw. He was in a serious condition, and I had great difficulty in removing the sloughed tissue and putting an interdental splint in place. I then applied a thick dressing of Antiphlogistine to reduce the effects of inflammation, and was delighted with the result. He made a perfect recovery.

THE DENVER CHEMICAL MFG. CO., New York



(Two-thirds actual size)

CAUTION

As original manufacturers and sole proprietors of the genuine STANDARD ALLOY we hereby caution the profession and the trade against certain cheap alloys now being marketed as "Standard Alloy." We admit the compliment. But conceding at most that the word "standard" is common property, any manufacturer who uses it for the purpose of trading on the established reputation of another invites the suspicion that the quality of his wares is on a par with that of his business morals.

We have found a few innocent students who were using an alloy with the pirated name. Old birds are not so likely to be caught with chaff. But to one and all we say, Do not buy on the name "Standard" alone, but look for the name of the original "New Departure" manufacturers

ECKFELDT & DuBOIS
1314 Arch St., Phila., Pa.

(Send for the Historical Circular)

ZHONGIVA

For the Mouth and Gums

We recommend *Zhongiva* to the earnest consideration of the Dental Profession as a *positive, prompt and reliable adjunct* in their treatment of Alveolar Pyorrhea and for all inflamed conditions of the mouth, *Recession of the Gums, Gingivitis, Spongy Gums, etc.* Its action is prompt and it is pleasant to use.

Send for sample; a trial is positively convincing.

James J. Ottinger, Mfr.
20th and Spruce Sts., Philadelphia, Pa.

ESSENTIAL FACTS ABOUT

Dr. R. B. Waite's ANTISEPTIC LOCAL ANAESTHETIC

For the Painless Extraction of Teeth
and all Minor Surgical Operations



1st. It is Absolutely Pure. Each and every ingredient which enters into its composition must meet the requirements of our chemist, being subjected to a rigid test, before it is accepted for use in our laboratories.

2nd. It is Uniform. Owing to the scientific methods and great care exercised in combining the ingredients it does not vary, and you get the same results today, tomorrow or a year hence.

3rd. It is Safe and Reliable. No impurities are being injected when using Dr. R. B. Waite's Local Anesthetic. Our guarantee of absolute PURITY is your protection.

4th. It Will Not Deteriorate, but will keep for years, consequently you always have ready to your hand, not only a perfect Anaesthetic, but Antiseptic, as well.

Free for Trial. One full ounce dollar bottle, or one box of 12 ampoules of 1½ cc. each upon receipt of \$.25 to cover the expense of packing and postage, providing you have not yet taken advantage of this offer.

PRICES:

1 oz., \$1.00; 6 ozs., \$5.00; 20 ozs., \$15.00;
1 box (12 ampoules, 1½ cc. each), \$0.75;
12 boxes, \$7.50.

MANUFACTURED ONLY BY

THE ANTIDOLAR MFG. CO.

18 Main Street, Springville, N. Y.

Branch. 498 Argyle Avenue, - Montreal, Quebec

Listerine Tooth Powder



TOOTH POWDERS have long been empirically employed, chiefly as a mechanical agent for cleansing the teeth, and with little regard to their composition or chemical action. Many of the articles sold for this purpose contain ingredients prone to fermentative action in the mouth, such as orris root, starch, sugar, etc., and, in addition, pumice stone, cuttlefish bone, or other harmfully abrasive substances.

Listerine Tooth Powder, possessing neither of these objectionable qualities, very acceptably meets all the requirements of a frictionary dentifrice, and promises to give much satisfaction to those who employ it, in conjunction with a mouth-wash of Listerine, suitably diluted.

To dental practitioners of record, the manufacturers will be pleased to send a supply of samples of Listerine Tooth Powder for distribution to patients.

LAMBERT PHARMACAL CO., St. Louis

Salvitae

Eugene S. Talbot, D.D.S., says:

"My studies on animals and human beings have demonstrated that this disease, pyorrhea alveolaris, (in the constitutional and large majority of cases) is the result of irritation in the blood stream, which sets up absorption of bone (not pathologic in the sense of necrotic), but precisely such absorption as results in the alveolar process when a tooth is extracted or in tooth movement. . . . This irritation is caused by changes in the blood stream (autointoxication and acidosis). . . . I still believe that there are local causes, but a large proportion are constitutional."

AUTOINTOXICATION and ACIDOSIS

It is universally conceded by physicians and stomatologists that both autointoxication—poisoning resulting from non-elimination of toxins formed within the body, and acidosis—increased acidity of the blood can be relieved by the internal administration of an agent having eliminant and alkalizing properties.

SALVITAE

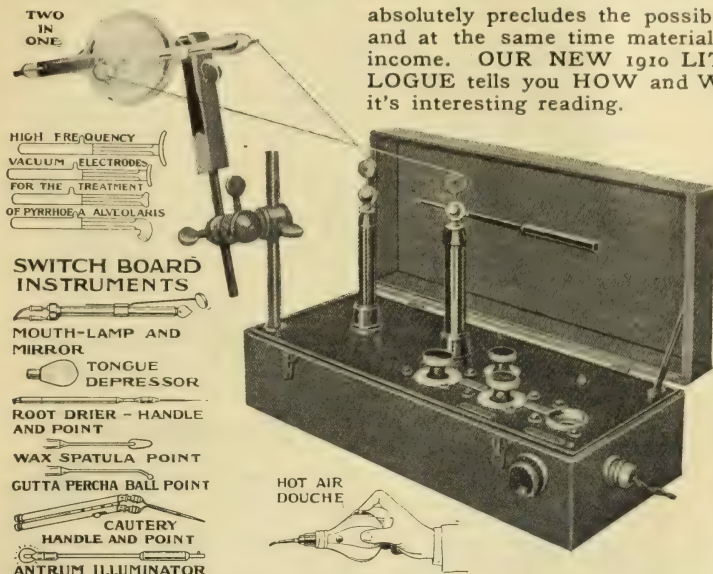
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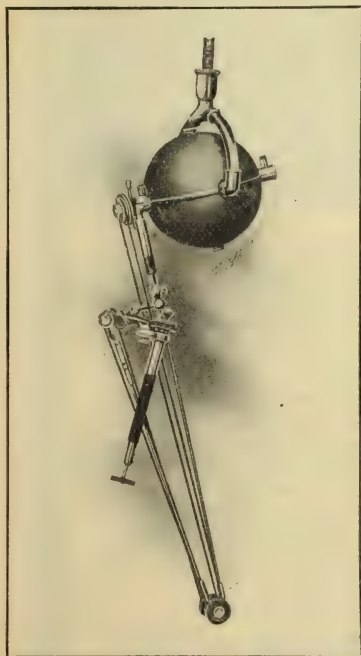
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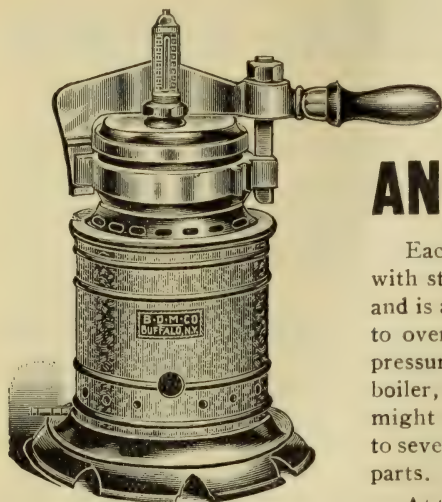
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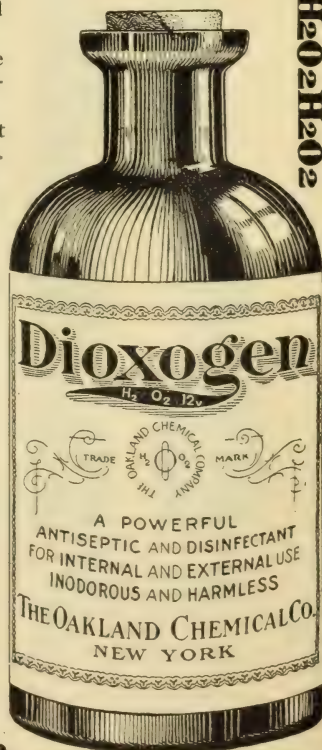
- That, DIOXOGEN does not contain acetanilid. It keeps without it.
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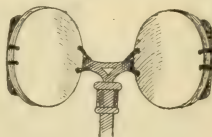
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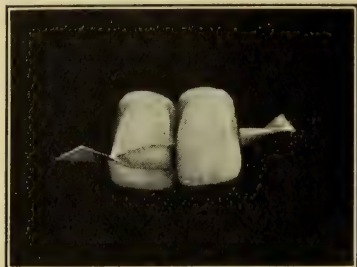
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diplomas issued by approved High School or literary colleges. Applicants may be admitted upon a minimum of 45 counts upon the condition that 15 additional counts shall be made up before entrance upon the second year of the course.

FEES

Matriculation Fee (paid once only)	\$5.00
Fee for one Course of Lectures	150.00
Gymnasium and Howard Houston Club, Membership Fee each year	10.00
Dissecting Fee, including material—First and Second Year, each	6.50

Board can be obtained at from five to eight dollars per week, according to location and accommodations.

The Dental Department is located in "Dental Hall," the new building especially erected for its use. The facilities thus afforded are, it is believed, unsurpassed for securing an education complete in all departments of dental science and art. The clinical operating room is 180 by 50 feet, lighted on all sides, and furnished with 100 Wilkerson Chairs of latest pattern, especially constructed for the Department. Each operating chair

has a fountain spittoon attached, also especially designed and constructed for this Department. Electrical service is supplied to all chairs, and is of a character to cover all of the applications of electricity to Dentistry. The Prosthetic Department is supplied with laboratory facilities devoted to every branch of the work. Prosthetic technic, in vulcanite and metal work, porcelain work, continuous-gum work, and crown

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and bridge work, is taught by modern methods in separate laboratories especially equipped for the purpose. The laboratories are furnished with power lathes and with compressed-air apparatus for soldering and metallurgical operations.

The clinical patronage of the Department is always in excess of the needs of the students.

Oral surgical clinics, also general surgical clinics, are held twice a week.

Practical instruction in Chemistry, Metallurgy, Histology, Physiology, and Bacteriology is given in appropriately equipped laboratories.

The Dissecting-room is large, well-lighted, thoroughly ventilated, and is furnished with ample material for the successful prosecution of anatomical studies.

The technic or manual training method of imparting instruction is developed in relation to all departments where it has been found applicable.

All of the departments of practical laboratory and

clinical instruction are in charge of competent and experienced demonstrators who are ably assisted in the work of instruction by a full corps of expert assistants.

The Dental Department of the University is an integral part of the University system. Its students at the discretion of the Dean are permitted to take courses of instruction in other departments of the University without additional fees, and are eligible to participate in all those features of University life common to the whole student body of the institution. These include its athletic features and privileges of the Howard Houston Hall, the club house of an organization governed by the University students and having all the appointments and desirable features of a strictly first-class club. The dormitories of the University are the best of their kind in this country, and to these the students of dentistry are admitted in common with the students of all the other departments.

THE ANNUAL SESSION

The session 1910-11 begins Friday, September 23d, and ends at commencement, the third Wednesday in June. (No student admitted to the regular course after October 10th.) The number of lecturers per week, with a synopsis of the various branches taught, will be found in the General Catalog.

The course of instruction extends over a period of three years.

In order to facilitate work in the practical branches and to economize the student's time, the regular ses-

sion is so arranged that students during the first year are required to devote the time equally to DENTAL HISTOLOGICAL AND CHEMICAL LABORATORY WORK. During the second and third years the student has practically the entire forenoon of each day for dental work. Thus ample opportunity is afforded for practice in OPERATIVE AND MECHANICAL DENTISTRY. In the latter branches the students of the first year are divided into sections, devoting the time not otherwise engaged in practice in the operating rooms.

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The gradation of the course enables the First-year student to present himself for examination in the following branches: CHEMISTRY, ELEMENTARY MATERIA MEDICA, HISTOLOGY, and ANATOMY, including OSTEOLOGY and MYOLOGY, OPERATIVE AND PROSTHETIC TECHNIQUES. The Second-year student will be examined in MATERIA MEDICA, BACTERIOLOGY, APPLIED ANATOMY and PHYSIOLOGY, and on the progress in OPERATIVE and MECHANICAL DENTISTRY. Such an arrangement is economical not only in point of time, but also in facilitating a student's acquirement of knowledge in the remaining branches.

The final examination at the close of the third year is in OPERATIVE DENTISTRY, MECHANICAL DENTISTRY, METALLURGY, DENTAL PATHOLOGY AND THERAPEUTICS, AND ORAL SURGERY.

All applicants for advanced standing must pass the required examination of this school, or furnish proof that they have passed EQUIVALENT examination in some recognized dental or medical school. Graduates of a recognized medical college will be admitted to the second-year class without examination.

For detailed information, and announcements, address

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